# APPENDIX A

# RCRA SAMPLING AND ANALYSIS PLAN

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| **APPENDIX A-1:** | **RCRA Pond Quality Assurance Project Plan (QAPP)** |
| **APPENDIX A-2:** | **Field Sampling Plan For RCRA Groundwater Monitoring** |
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# APPENDIX A-4

# RCRA Pond Quality Assurance Project Plan (QAPP) For Gas Monitoring

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# 1.0 PROJECT MANAGEMENT

This plan describes the quality assurance and quality control (QA/QC) requirements for gas monitoring activities performed at the FMC Idaho, LLC (FMC) facility to meet the Resource Conservation and Recovery Act (RCRA) requirements for interim status specified in 40 CFR 265. This facility ceased producing elemental phosphorus from phosphate ore in December 2001 and is no longer in operation. This plan was prepared in accordance with the following the guidance:

- *Guidance for the Data Quality Objectives (DQO) Process* (EPA, 2000),
- *EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5* (EPA, March 2001);
- *Guidance for Quality Assurance Project Plans, EPA QA/G-5* (EPA, December 2002); and
- *Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4* (EPA, February 2006).

This *Quality Assurance Project Plan* (QAPP) will be revised when appropriate, per 40 CFR §265.228. The requirements of this QAPP will be implemented using the *Field Sampling Plan for RCRA Pond Gas Monitoring* ("*Gas Monitoring FSP*") that is Appendices A-5 of the *RCRA Pond Post-Closure Plan ("Plan")*) which provides detailed field procedures for gas monitoring.

This document is organized as follows:

- Section 1 - Project Management addresses project management, including roles and responsibilities of the participants, overall gas monitoring program objectives and associated data quality objectives.
- Section 2 - Data Generation and Acquisition addresses methods for sampling, measurement, data collection or generation, data management and quality control (QC) activities are employed and properly documented.
- Section 3 - Assessments and Oversight addresses the requirements for assessing the effectiveness of the QC measures described in this QAPP.
- Section 4 - Data Usability provides requirements for review and verification of monitoring data and usability.

## 1.1 PROJECT ORGANIZATION

The responsibilities of key project positions are as follows:

- The FMC Remediation Director is responsible for overall program execution and quality. The remediation director is ultimately responsible for the quality of the data collected and for the interpretations of these data that will be presented to the data users.

- The FMC Project Coordinator is responsible for managing specific field activities (e.g. gas monitoring) including direct management of field contractors. Also responsible for assembly, organization and maintenance of all information collected during monitoring activities.
- The gas monitoring contractors are responsible for the collection and reporting of field data relevant to monitoring and data management. The gas monitoring contractors are also responsible for maintenance of the gas monitoring records.

All personnel are responsible for identifying problems that may arise in the collection and reporting of project data and overseeing the implementation of the necessary corrective actions. The FMC Project Coordinator will track, review, and verify the effectiveness of corrective actions.

## 1.2 BACKGROUND

The post-closure phosphine (PH3) monitoring program was developed utilizing over 2 years of gas monitoring data at the RCRA ponds obtained pursuant to the RCRA Pond Unilateral Administrative Order for Removal Actions (UAO, EPA, 2010b). The prior RCRA Pond gas monitoring program, monitoring data, evaluation of that data and recommendations that led to the RCRA Pond post-closure phosphine (PH3) monitoring program are not described herein and can be found in the following documents:

- RCRA Pond Phosphine Assessment Study Work Plan – Final, November 2010, Revised July 2011;
- RCRA Pond Phosphine Assessment Study Report, January 2012;
- Technical Memorandum - First Quarter 2012 Update for Ponds 16S and 18A - RCRA Pond Phosphine Assessment Study, April 11, 2012;
- Technical Memorandum - Second Quarter 2012 Update for Ponds 16S and 18A - RCRA Pond Phosphine Assessment Study; July 16, 2012;
- Framework for Post-Closure Phosphine Monitoring, RCRA Ponds, FMC Facility, Pocatello, ID." July 16, 2012;
- FMC Response to EPA Draft Comments on FMC's July 16, 2012, Framework for Post-Closure Phosphine Monitoring, RCRA Ponds, FMC Facility, Pocatello, ID, October 16, 2012; and
- Final Update to the RCRA Pond Phosphine Assessment Study Report, XXXX.

## 1.3 PROJECT SCOPE

The scope of this QAPP covers the RCRA post-closure gas monitoring associated with the closed RCRA Ponds. These closed ponds include:

- Pond 8E

- Pond 9E
- Pond 8S
- Phase IV Ponds (consisting of Ponds 11S, 12S, 13S and 14S)
- Pond 15S
- Pond 16S
- Pond 17
- Pond 18A

This QAPP and the associated *Gas Monitoring FSP* constitute the RCRA sampling and analysis plan (SAP) used for gas monitoring associated with the RCRA ponds at the FMC Plant Site. Gas monitoring data collection includes:

- Pond appurtenance phosphine (PH3) monitoring;
- Pond perimeter gas collection piping PH3 monitoring;
- Pond perimeter surface and, if triggered, pond cap surface PH3 monitoring; and
- Contingent fenceline and, if triggered off-site PH3 monitoring. Each pond and associated RCRA gas monitoring locations are identified in Figures 3-3 through 3-18 of the Plan. The contingent fenceline and off-site PH3 monitoring locations are identified on Figure 2-3 of the *Gas Monitoring FSP*.

## 1.4 PROJECT SCHEDULE

Post-closure monitoring will continue for 30 years after completion of closure of each RCRA pond unless shortened or lengthened by the Regional Administrator in accordance with 40 C.F.R. §265.117. FMC will petition EPA to reduce the post-closure monitoring period in accordance with 40 C.F.R. §265.118(g) in the event the Company concludes that a monitoring period of shorter duration is warranted.

## 1.5 DATA QUALITY OBJECTIVES

Data quality refers to the level of reliability associated with a particular data set or data point. The data quality associated with the gas monitoring data is a function of the sampling plan, the sample collection procedures, and the analytical methods and instrumentation used in making the measurements. The overall QA objective is to develop and implement procedures for field sampling / measurement and data reporting that will provide data that meet project DQOs and

are legally defensible. Data quality objectives are qualitative and quantitative statements that specify the field data quality necessary to support specific decisions or regulatory actions. The DQOs describe which data are needed, why the data are needed, and how the data are to be used to meet the needs of the RCRA Pond gas monitoring. DQOs also establish numeric limits for the data to allow the data user (or reviewers) to determine whether the data collected are of sufficient quality for their intended use.

The DQOs for the RCRA pond post-closure gas monitoring are discussed below. The remainder of this section defines how the data will be assessed to meet the DQOs and the criteria that will be used to define acceptable limits of uncertainty.

**1. State the problem.** *Concisely describe the problem to be studied. Review prior studies and existing information to gain a sufficient understanding to define the problem. Identify the planning team members, including the decision-makers. For each data gap category, the problem statement is presented. Planning team members and decision-makers are the same for each data collection activity.*

**2. Identify the decision.** *Identify what questions the study will attempt to resolve and what actions may result from each decision. Develop a decision statement.*

**3. Identify the decision inputs.** *Identify the information that needs to be obtained and the measurements that need to be taken to resolve the decision statement.*

**4. Define the study boundaries.** *Specify the time periods and spatial boundaries to which decisions will apply. Determine when and where data should be collected. Define the target population of interest.*

**5. Develop the decision rules.** *Define the statistical parameter of interest, specify the action level, and integrate the previous DQO outputs into a single statement that describes the logical basis for choosing among alternative actions. Define an "if... then..." statement.*

**6. Specify tolerance limits on decision errors.** *Define the decision-makers' tolerable decision error rates based on a consideration of the consequences of making an incorrect decision.*

**7. Optimize the sampling design.** *Evaluate information from the previous steps and generate alternative data collection designs. Choose the most resource-effective design that meets all DQOs.*

### 1.5.1 OVERALL RCRA POND GAS MONITORING OBJECTIVES

The overall objective of the RCRA Pond gas monitoring program is the effective and timely detection of gas concentrations within the closed units and appurtenant post-closure systems at levels that require maintenance action and/or initiation of gas extraction and treatment to control, minimize, or eliminate post-closure escape of hazardous constituents to the atmosphere to the extent necessary to protect human health and the environment. A coequal objective is the effective and timely detection of gas concentrations within the closed units and appurtenant post-closure systems at levels that require maintenance action and/or initiation of gas extraction and

treatment to protect and preserve the closure cover and post-closure monitoring systems ("post-closure infrastructure").

In order to protect post-closure monitoring and maintenance (and other) personnel within the RCRA Ponds area, the OSHA Permissible Exposure Limits (PELs) for were used to guide development of the gas monitoring program and specifically the triggers for corrective maintenance, additional monitoring and initiation of gas extraction and treatment.

| Summary of Phosphine Exposure Limits | |
|---|---|
| Permissible Exposure Limit (PEL) | 0.3 ppm |
| Short-Term Exposure Limit (STEL) | 1.0 ppm |
| Immediately Dangerous to Life or Health (IDLH) | 50 ppm |

In order to protect and preserve the closure cover and post-closure monitoring systems ("post-closure infrastructure"), the Lower Explosive Limit (LEL) for PH3 of approximately 20,000 ppm was used to develop the gas monitoring program and specifically the trigger for initiation of gas extraction and treatment. After reviewing the propagated relative error for the calculation of source gas concentrations when using a GES unit for routine perimeter pipe monitoring and /or gas extraction and treatment, the propagated relative error is 15% (rounded up from 12.5%). As an added margin of safety, the propagated relative error was "doubled" to arrive at the 14,000 ppm PH3 (70 percent of the LEL) for the perimeter pipe concentration that triggers gas extraction and treatment.

### 1.5.2 DATA QUALITY OBJECTIVES FOR GAS MONITORING PROGRAM ACTIVITIES

To meet the objectives, data of known quality will be collected at the locations and monitoring frequency specified in Section 3 of the Plan and the *Gas Monitoring FSP* (Appendix A-5 of the *Plan*). The data quality objectives for the RCRA pond gas monitoring program are presented on:

Table 1.1 DQOs for Appurtenance Gas Monitoring;
Table 1.2 DQOs for Perimeter Pipe Gas Monitoring;
Table 1.3 DQOs for Perimeter and Cap Surface Scan Monitoring; and
Table 1.4 DQOs for Contingent Fenceline Phosphine Monitoring.

## 1.6 SUMMARY OF GAS MONITORING ACTIVITIES

The following subsections provide a summary of the gas monitoring activities for the closed RCRA ponds. Each pond and associated gas monitoring locations are identified in Figures 3-3 through 3-18 in the Plan and the field procedures are detailed in the *Gas Monitoring FSP* (Appendix A-5 of the Plan).

### 1.6.1 POND APPURTENANCE MONITORING

The appurtenance gas monitoring program is summarized on Table 3.2 of the Plan and the appurtenance monitoring locations at each RCRA pond are shown on Figures 3-3 to 3-10 in the Plan. The field procedures are detailed in Section 2.3 of the *Gas Monitoring FSP* (Appendix A-5 of the Plan).

RCRA pond cap appurtenances that will be monitored for potential PH3 are:

- *TMP Enclosures* – TMP enclosures are present on all of the RCRA ponds.
- *ET Cap Drainage Sumps* – ET cap drainage collection sumps are present at Ponds 8S, the Phase IV ponds, and Ponds 15S, 16S and 18A.
- *LCDRS Collection Sumps* – Leachate Collection, detection and Removal System (LCDRS) sumps are present at Ponds 8E, 9E, 15S, 16S, 17, and 18A.
- *Instrument Panels* – "Instrument panel" is a generalized term for the steel enclosures that house (1) pressure and temperature data displays / recording modules, (2) pressure and temperature system audible / visual alarms if separate from the data display housing and (3) power supply / switches that are present at all of the RCRA ponds.
- *Perimeter Piping Standpipes* – Each of the RCRA pond cover systems is equipped with perforated perimeter piping installed immediately under the GCL/HDPE cap liner.

Monitoring for PH3 at RCRA pond appurtenances will include:

- *Air monitoring* – monitoring around the appurtenance at a distance of approximately 12 inches to determine whether, and to what extent, PH3 has been released to the air.
- *Leak detection* – monitoring around the appurtenance at a distance of approximately 1 to 2 inches from potential leakage points.
- *Inside* – monitoring inside appurtenance at a depth of approximately 1.5 feet inside TMP enclosures, 3 to 4 feet inside ET Cap Drainage and LCDRS sumps, and 6-inches inside instrument panels.

The instrument panels associated with the discontinued temperature and pressure monitoring are no longer used to acquire / display temperature or pressure data. FMC will continue to perform instrument panel gas monitoring at these panels per the Plan and Section 2.3.6 of the *Gas Monitoring FSP*. FMC may submit a plan to EPA to disconnect and remove these instrument panels. Upon EPA approval, the panels will be removed and will be eliminated from the instrument panel gas monitoring.

The appurtenance monitoring frequency is based on the perimeter pipe PH3 concentration and results of on-going appurtenance monitoring as follows:

| Perimeter Pipe PH3 Concentration | Monitoring Frequency |
|---|---|
| < 2,000 ppm | Quarterly / Annually |
| 2,000 – 9,999 ppm | Quarterly |
| 10,000 – 13,999 ppm | Monthly |
| ≥ 14,000 ppm | Monthly |

For RCRA Ponds with perimeter pipe PH3 concentrations below 2,000 ppm, the appurtenance monitoring will initially be performed on a quarterly basis. If there are no PH3 detections at or above the PH3 action levels for three (3) consecutive quarters of monitoring, the frequency will be reduced to annually for that pond. If there is a PH3 detection above the action levels during annual monitoring, the monitoring will return to quarterly (or other frequency corresponding to the perimeter pipe PH3 concentration). For RCRA Ponds with perimeter pipe PH3 concentrations greater than 2,000 ppm, the appurtenance monitoring remains at the specified frequency until the perimeter pipe PH3 concentration either drops below 2,000 ppm (frequency decreases to quarterly / annually) or increases to a higher range (e.g., from a range between 2,000 and 9,999 ppm to a range between 10,000 and 13,999 ppm, the monitoring increases from quarterly to monthly).

The action levels for appurtenance monitoring are:

Air or Leak Detection Monitoring PH3: ≥ 0.05 ppm

Inside Monitoring PH3: ≥ 0.3 ppm, ≥ 1.0 ppm and ≥ 35 ppm

Industrial hygiene monitoring PH3: ≥ 0.3 ppm and ≥ 1.0 ppm

The responses related to these action levels are described below:

Air or Leak Detection Monitoring PH3 > 0.05 ppm or Inside Monitoring PH3 > 0.3 ppm

- Perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial exceedance.
- If air or leak detection re-monitoring < 0.05 ppm and/or inside re-monitoring < 0.3 ppm, re-monitor location(s) of exceedance(s) one month from initial exceedance.
- If air or leak detection re-monitoring ≥ 0.05 ppm and/or inside re-monitoring ≥ 0.3 ppm, perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial (or remonitoring) exceedance.
- If three consecutive results of air or leak detection re-monitoring ≥ 0.05 ppm and/or inside re-monitoring ≥ 0.3 ppm, monitor perimeter gas collection standpipe within 10 days.

Inside Monitoring PH3 > 1.0 ppm

- Perform maintenance and re-monitoring per actions for Inside Monitoring ≥ 0.3 ppm above.
- Monitor perimeter gas collection standpipe(s) within 10 days – change frequency of monitoring if indicated by perimeter pipe PH3 concentration.

Inside Monitoring PH3 > 35 ppm

- Begin gas extraction and treatment within 10 days – change frequency of monitoring based on perimeter pipe PH3 concentration (GES operating data or perimeter pipe monitoring) or increase PH3 mass removal rate if gas extraction and treatment in progress.

In addition to the above action levels, individuals performing RCRA pond appurtenance monitoring will be equipped with an industrial hygiene PH3 monitor, set to alarm at 0.3 ppm and 1.0 ppm as indicated in the *RCRA Pond Area Work Rules*. Any industrial hygiene alarm of 0.3 ppm PH3 in air (indicating PH3 concentrations in air of 0.3 to 0.99 ppm) that occur will trigger an investigation of the source and potential corrective action provided that these measures can be safely performed. Any air monitoring reading of 1.0 ppm PH3 or greater in air will also trigger an immediate (within 15 minutes of such reading) additional round of fenceline monitoring at facility boundary monitoring sites 1 through 9, as described in Section 2.3.4 of the *Plan* and Section 2.6 in Appendix A-5 Field Sampling Plan for RCRA Pond Gas Monitoring. Note that for RCRA pond appurtenance monitoring, additional fenceline monitoring is not triggered solely by leak detection results (at 1 to 2 inches from the appurtenance) or inside appurtenance that show 1.0 ppm PH3 or greater.

### 1.6.2 POND PERIMETER GAS COLLECTION PIPING MONITORING

The pond perimeter pipe monitoring program is summarized on Table 3.3 of the *Plan* and the appurtenance monitoring locations at each RCRA pond are shown on Figures 3-3 to 3-10 in the *Plan*. The field procedures are detailed in Section 2.4 of the *Gas Monitoring FSP* (Appendix A-5 of the *Plan*).

The perimeter gas collection pipe will monitored utilizing a GES unit connected to the perimeter gas collection piping outlet(s) ("standpipe(s)"). Seven of the RCRA ponds have a single standpipe and the other four have multiple standpipes:

- Pond 8S: 1 Standpipe
- Pond 8E: 1 Standpipe
- Pond 9E: 1 Standpipe
- Phase IV: 4 Standpipes (one each at 11S, 12S, 13S and 14S)
- Pond 15S: 2 Standpipes
- Pond 16S: 4 Standpipes
- Pond 17: 5 Standpipes
- Pond 18A: 2 Standpipes

At ponds that have multiple standpipes, each of the standpipes will be monitored when the perimeter gas collection pipe monitoring is performed. If after five (5) years of monitoring, one of the standpipes is consistently measured with the highest PH3 concentration compared to the

other standpipes, FMC may request and, upon EPA approval, monitoring would only be performed at the standpipe with the highest PH3 concentration thereafter.

The perimeter pipe monitoring frequency is based on the perimeter pipe PH3 concentration and action levels (concentration ranges) as follows:

| Perimeter Pipe PH3 Concentration | Monitoring Frequency |
|---|---|
| < 2,000 ppm (at ponds where gas extraction has not been required) | If triggered by exceedance of appurtenance monitoring action level(s) |
| 2,000 – 9,999 ppm | Quarterly |
| 10,000 – 13,999 ppm | Monthly |
| ≥ 14,000 ppm | Monthly [1] |

[1] GES unit(s) operating data (average calculated source gas) and monitoring (if multiple standpipes without operating GES at one or more standpipes).

As shown on Figure 3.2, when the monitored perimeter pipe PH3 concentration is 2,000 ppm or greater (based on highest perimeter pipe standpipe concentration at ponds with multiple standpipes), the perimeter pipe monitoring frequency can either increase, remain at the same frequency or decrease based on subsequent monitoring results or GES operating data if gas extraction and treatment has been initiated at the pond. Once routine perimeter pipe monitoring has been initiated due to a monitoring result of 2,000 ppm or greater, the perimeter pipe monitoring program requires a minimum of 4 years of perimeter pipe monitoring and only if the subsequent perimeter pipe monitoring results are consistently below 2,000 ppm. An example of the decreasing perimeter pipe monitoring frequency schedule is provided in Section 3.2.2 of the Plan.

Gas extraction and treatment will begin within 10 days at a RCRA pond(s) when the perimeter gas collection pipe PH3 concentration is greater than or equal to 14,000 ppm as measured at the highest (if multiple) standpipe. Gas extraction and treatment system operations and maintenance is described in Section 4 of the Plan and detailed procedures are contained in Appendix A-6 GES Unit Operation and Maintenance Manual of the Plan.

### 1.6.3 POND PERIMETER AND CAP SURFACE MONITORING

The pond perimeter surface and cap surface monitoring program is summarized on Table 3.4 of the Plan and the perimeter and cap surface monitoring locations at each RCRA pond are shown on Figures 3-11 to 3-18 in the Plan. The field procedures are detailed in Section 2.5 of the *Gas Monitoring FSP* (Appendix A-5 of the Plan).

Each of the pond perimeter surface scanning areas will be sampled as a single sampling "cell." The approximate lineal distance for scanning at each RCRA pond is as follows:

- Pond 8S = 1,550 feet (see Figure 3-11 of the Plan);
- Pond 8E = 1,725 feet (see Figure 3-12 of the Plan);
- Pond 9E = 3,520 feet (see Figure 3-13 of the Plan);
- Phase IV Ponds = 2,970 feet (see Figure 3-14 of the Plan)

- Pond 15S = 3,080 feet (see Figure 3-15 of the Plan)
- Pond 16S = 2,850 feet (see Figure 3-16 of the Plan)
- Pond 17 = 2,300 feet (see Figure 3-17 of the Plan)
- Pond 18A = 2,250 feet (see Figure 3-18 of the Plan)

This pond cap surface scan will use the same procedure as the pond perimeter surface scan, except that the pond cap surface will be divided into approximately equal sampling "cells" of about one acre each. Therefore, if triggered, the number of sampling cells for each RCRA pond will be the following:

- Pond 8S = 3.2 acres = 3 sampling cells (see Figure 3-11 of the Plan);
- Pond 9E = 12.9 acres = 13 sampling cells (see Figure 3-12 of the Plan);
- Pond 8E = 4.1 acres = 4 sampling cells (see Figure 3-13 of the Plan);
- Phase IV Ponds = 8.9 acres = 9 sampling cells (see Figure 3-14 of the Plan);
- Pond 15S = 9.4 acres = 9 sampling cells (see Figure 3-15 of the Plan);
- Pond 16S = 10.1 acres = 10 sampling cells (see Figure 3-16 of the Plan);
- Pond 17 = 9 acres = 9 sampling cells (see Figure 3-17 of the Plan); and
- Pond 18A = 3.8 acres = 4 sampling cells (see Figure 3-18 of the Plan).

If perimeter gas collection piping PH3 concentrations are 10,000 ppm or greater, then perimeter surface monitoring and, if triggered during perimeter scan, cap surface monitoring will be performed monthly.

All surface scanning will only be performed during certain meteorological conditions. The surface scanning will not be performed if any of the following meteorological conditions are encountered:

- Rain, snow or other precipitation, based upon local observation;
- Average wind speeds greater than 10 miles per hour, based upon a hand-held anemometer reading;
- Instantaneous wind speed greater than 15 miles per hour, based upon a hand-held anemometer reading;
- Snow cover or surface water accumulation (ponding), based upon local observation.

If PH3 is detected at any location during the pond cap perimeter surface at or above the action level of 0.05 ppm, the following actions would be taken:

- Attempt to determine the source of the PH3 at the surface;
- Follow the perimeter surface scan with a surface scan over the entire RCRA pond cap surface;
- If a source(s) of the PH3 is identified, perform maintenance within 10 days; and
- Perform a follow-up round of perimeter surface monitoring and, if triggered during perimeter scan, cap surface monitoring within 10 days.

In addition to the above action levels, individuals performing RCRA perimeter and cap surface monitoring will be equipped with an industrial hygiene PH3 monitor, set to alarm at 0.3 ppm and

1.0 ppm as indicated in the RCRA Pond Area Work Rules. Any industrial hygiene alarm of 0.3 ppm PH3 in air (indicating PH3 concentrations in air of 0.3 to 0.99 ppm) that occur will trigger an investigation of the source and potential corrective action provided that these measures can be safely performed. Any air monitoring reading of 1.0 ppm PH3 or greater in air will also trigger an immediate (within 15 minutes of such reading) additional round of fenceline monitoring at facility boundary monitoring sites 1 through 9, as described in Section 3.2.4 of the *Plan* and Section 2.6 in Appendix A-5 Field Sampling Plan for RCRA Pond Gas Monitoring.

### 1.6.4 CONTINGENT FENCELINE MONITORING

The contingent fenceline monitoring field procedures are detailed in Section 2.6 of the *Gas Monitoring FSP* and the fenceline and off-site monitoring locations are shown on Figure 2-3 of the Gas Monitoring FSP (Appendix A-5 of the Plan).

Contingent fenceline monitoring will be conducted if triggered by the following:

- As prescribed by the *RCRA Pond Area Work Rules*, individuals will be equipped with an industrial hygiene PH3 monitor, set to alarm at 0.3 ppm and 1.0 ppm. An alarm reading of 1.0 ppm PH3 or greater in air will trigger an immediate (within 15 minutes of such reading) round of fenceline monitoring at facility boundary monitoring sites 1 through 9.
- Any ambient air reading equal to or exceeding 1.0 ppm PH3 that is registered during RCRA pond appurtenance air monitoring (i.e., approximately 12-inches outside TMP enclosures, LCDRS manholes, cap drainage lift stations or control panels, regardless of height above ground surface) or RCRA pond perimeter surface and, if triggered, cap surface monitoring will trigger an immediate (within 15 minutes of such reading) round of fenceline monitoring at sites 1 through 9.

The fenceline monitoring result threshold levels for initiating offsite monitoring and response actions in the event that action levels are exceeded are shown on Table 2-1 of the *Gas Monitoring FSP*. The off-site monitoring and response procedures, including communication, continued surveillance and notification requirements are detailed in Section 2.6 of the *Gas Monitoring FSP*.

## 1.7 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

All personnel directly involved in sample collection (field monitoring) and data evaluation will be provided with a copy of this QAPP and the *Gas Monitoring FSP*. Personnel will be trained in the requirements specified herein, or provided ample time to read and become familiar with the requirements prior to beginning data collection activities. Any persons entering the fenced area containing the closed RCRA ponds will be given training on the *RCRA Pond Area Work Rules* and the *RCRA Facility-Wide Contingency Plan – FMC Idaho, LLC.* Persons directly involved in sampling on the FMC Plant Site will also be required to have hazardous waste operations and emergency response training (HAZWOPER) per the requirement of 29 CFR § 1910.120.

## 1.8 DOCUMENTATION AND RECORDS

All monitoring records will be maintained consistent with Section 7.3 of the Plan.

**TABLE 1.1**
**DATA QUALITY OBJECTIVES – RCRA POND GAS MONITORING**
**Appurtenance Monitoring**
**(Page 1 of 2)**

| DQO Step | TMP Enclosure Monitoring | ET Cap Drainage and LCDRS Sump Monitoring | Instrument Panel Monitoring [1] | Perimeter Piping Standpipe Monitoring |
|---|---|---|---|---|
| **Step 1 - State the Problem** | | | | |
| Problem Statement | PH3 may be accumulating beneath the RCRA final caps and migrating into the appurtenant post-closure systems at levels that could result in exposure of post-closure monitoring and maintenance (and other) personnel within the RCRA Ponds to PH3 levels above the OSHA permissible exposure limits (PELs) and/or that could adversely affect the functionality of the closure cover and post-closure monitoring systems ("post-closure infrastructure"). | | | |
| Planning Team | U.S. Environmental Protection Agency (EPA)<br>FMC Project Coordinator<br>FMC Gas Monitoring Contractors | | | |
| **Step 2 – Identify the Decision** | | | | |
| Principal Study Question | Are PH3 concentrations within the closed units and appurtenant post-closure systems at levels that require (1) maintenance action and/or (2) initiation of gas extraction and treatment to control, minimize, or eliminate post-closure escape of hazardous constituents to the atmosphere to the extent necessary to protect human health and the environment and/or to protect and preserve the closure cover and post-closure monitoring systems ("post-closure infrastructure")? | | | |
| Alternative Actions | None. | | | |
| **Step 3 – Identify Inputs to the Decision** | | | | |
| Physical Inputs | Measurement of gaseous PH3 in air:<br>• Air Monitoring: 12 inches outside perimeter of appurtenance.<br>• Leak Monitoring: 1-2 inches from potential leakage points.<br>• Inside: 1.5 feet inside TMP enclosures; 3-4 feet inside ET Cap Drainage and LCDRS sumps; and 6 inches inside instrument panels. | | | Measurement of gaseous PH3 in air:<br>• Air Monitoring: 12 inches outside perimeter of appurtenance.<br>• Leak Monitoring: 1-2 inches from potential leakage points. |
| Chemical Inputs | Phosphine (PH3) concentrations using a hand-held PH3 meter (Draeger Pac III [2]). | | | |
| Action Levels [3] | Air or Leak Detection Monitoring PH3 $\geq$ 0.05 ppm<br>Inside Monitoring PH3 $\geq$ 0.3 ppm; $\geq$ 1.0 ppm and $\geq$ 35 ppm | | | Air or Leak Detection Monitoring PH3 $\geq$ 0.05 ppm |
| **Step 4 – Define the Boundaries of the Study** | | | | |
| Spatial Boundaries | The locations of the appurtenances at each RCRA Pond that will be monitored are shown on Figures 3-3 to 3-10 of the Plan. | | | |
| | Air Monitoring: 12 inches outside perimeter of appurtenance.<br>Leak Monitoring: 1-2 inches from potential leakage points.<br>Inside: 1.5 feet inside TMP enclosures. | Air Monitoring: 12 inches outside perimeter of appurtenance.<br>Leak Monitoring: 1-2 inches from potential leakage points.<br>Inside: 3-4 feet inside ET Cap Drainage and LCDRS sumps. | Air Monitoring: 12 inches outside perimeter of appurtenance.<br>Leak Monitoring: 1-2 inches from potential leakage points.<br>Inside: 6 inches inside instrument panels. | Air Monitoring: 12 inches outside perimeter of appurtenance.<br>Leak Monitoring: 1-2 inches from potential leakage points |
| Temporal Boundaries | The appurtenance monitoring frequency is based on the perimeter gas collection pipe PH3 concentration:<br>Perimeter Pipe PH3 Concentration / Monitoring Frequency<br>< 2,000 ppm — Quarterly / Annually [4]<br>2,000 – 9,999 ppm — Quarterly<br>10,000 – 13,999 ppm — Monthly<br>$\geq$ 14,000 ppm — Monthly | | | |

**TABLE 1.1**
**DATA QUALITY OBJECTIVES – RCRA POND GAS MONITORING**
**Appurtenance Monitoring**


| DQO Step | TMP Enclosure Monitoring | ET Cap Drainage and LCDRS Sump Monitoring | Instrument Panel Monitoring [1] | Perimeter Piping Standpipe Monitoring |
|---|---|---|---|---|
| **Step 5 – Develop a Decision Rule** | | | | |
| | Air and Leak Detection Monitoring PH3 < 0.05 ppm and Inside Monitoring PH3 < 0.3 ppm<br>• Continue monitoring on prescribed schedule.<br>Air or Leak Detection Monitoring PH3 > 0.05 ppm or Inside Monitoring PH3 > 0.3 ppm<br>• Perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial exceedance.<br>• If air or leak detection re-monitoring < 0.05 ppm and/or inside re-monitoring < 0.3 ppm, re-monitor location(s) of exceedance(s) one month from initial exceedance.<br>• If air or leak detection re-monitoring ≥ 0.05 ppm and/or inside re-monitoring ≥ 0.3 ppm, perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial (or re-monitoring) exceedance.<br>• If three consecutive air or leak detection re-monitoring results ≥ 0.05 ppm and/or inside re-monitoring ≥ 0.3 ppm, monitor perimeter gas collection standpipe within 10 days.<br>Inside Monitoring PH3 > 1.0 ppm<br>• Perform maintenance and re-monitoring per actions for Inside Monitoring ≥ 0.3 ppm above.<br>• Monitor perimeter gas collection standpipe(s) within 10 days – change frequency of monitoring if indicated by perimeter pipe PH3 concentration.<br>Inside Monitoring PH3 > 35 ppm<br>• Begin gas extraction and treatment within 10 days – change frequency of monitoring based on perimeter pipe PH3 concentration (GES operating data or perimeter pipe monitoring) or increase PH3 mass removal rate if gas extraction and treatment in progress. | | | Air and Leak Detection Monitoring PH3 < 0.05 ppm<br>• Continue monitoring on prescribed schedule.<br>Air or Leak Detection Monitoring PH3 > 0.05 ppm<br>• Perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial exceedance.<br>• If re-monitoring < 0.05 ppm, re-monitor location(s) of exceedance(s) one month from initial exceedance.<br>• If re-monitoring ≥ 0.05 ppm, perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial (or re-monitoring) exceedance.<br>• If three consecutive re-monitoring results ≥ 0.05 ppm, monitor perimeter gas collection standpipe within 10 days. |
| **Step 6 – Specify Tolerable Limits on Decision Errors** | | | | |
| | The Draeger Pac III field PH3 monitors have an accuracy of ± 5% of the displayed value. | | | |
| **Step 7 – Develop the Plan for Obtaining the Data** | | | | |
| | The data collection design is described in Section 2.3 of the *Field Sampling Plan for RCRA Pond Gas Monitoring* (Appendix A-5 of the *RCRA Pond Post-Closure Plan*). | | | |

NOTES:

[1] The instrument panels associated with the discontinued temperature and pressure monitoring are no longer used to acquire / display temperature or pressure data, but will be included in the appurtenance gas monitoring as instrument panels per the Plan and Section 2.3.6 of the FSP. FMC may submit a plan to EPA to disconnect and remove these instrument panels. Upon EPA approval, the panels will be removed and will be eliminated from the instrument panel gas monitoring.

[2] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

[3] The *RCRA Pond Area Work Rules* require that employees immediately relocate from a work area if PH3 concentrations in the working area reach or exceed 1.0 ppm. Sampling will be conducted only if conformance to these work rules can be achieved.

[4] For RCRA Ponds with perimeter pipe PH3 concentrations below 2,000 ppm, this monitoring will initially be performed on a quarterly basis. If there are no PH3 detections at or above the PH3 action levels for three (3) consecutive quarters of monitoring, the frequency will be reduced to annually for that pond. If there is a PH3 detection above the action levels during annual monitoring, the monitoring will return to quarterly (or other frequency corresponding to the perimeter pipe PH3 concentration).

**TABLE 1.2**
**DATA QUALITY OBJECTIVES – RCRA PONDS**
**Perimeter Gas Collection Pipe ("Standpipe") Monitoring**


| DQO Step | Pond Perimeter Piping Monitoring |
|---|---|
| **Step 1 - State the Problem** | |
| Problem Statement | PH3 may be accumulating beneath the RCRA final caps and migrating into the appurtenant post-closure systems at levels that could result in exposure of post-closure monitoring and maintenance (and other) personnel within the RCRA Ponds to PH3 levels above the OSHA permissible exposure limits (PELs) and/or that could adversely affect the functionality of the closure cover and post-closure monitoring systems ("post-closure infrastructure"). |
| Planning Team | U.S. Environmental Protection Agency (EPA)<br>FMC Project Coordinator<br>FMC Gas Monitoring Contractors |
| **Step 2 – Identify the Decision** | |
| Principal Study Question | Are PH3 concentrations within the closed units and appurtenant post-closure systems at levels that require (1) maintenance action and/or (2) initiation of gas extraction and treatment to control, minimize, or eliminate post-closure escape of hazardous constituents to the atmosphere to the extent necessary to protect human health and the environment and/or to protect and preserve the closure cover and post-closure monitoring systems ("post-closure infrastructure")? |
| Alternative Actions | None. |
| **Step 3 – Identify Inputs to the Decision** | |
| Physical Inputs | Length of gas collection piping for each pond to determine purge time prior to recording readings during monitoring.<br>During monitoring, extraction flow-rates of perimeter gas collection piping gas, flow-rates of dilution air, and GES inlet PH3 concentrations after dilution. |
| Chemical Inputs | Extracted gas from the pond perimeter piping will be monitored for PH3 using a hand-held PH3 meter (Draeger Pac III [1]). |
| Action Levels | Perimeter gas collection piping PH3 concentrations: 2,000 ppm, 10,000 ppm and 14,000 ppm |
| **Step 4 – Define the Boundaries of the Study** | |
| Spatial Boundaries | Seven of the RCRA ponds have a single standpipe and the other four have multiple standpipes:<br>Pond 8S: 1 Standpipe; Phase IV: 4 Standpipes (one each at 11S, 12S, 13S and 14S); Pond 17: 5 Standpipes<br>Pond 8E: 1 Standpipe; Pond 15S: 2 Standpipes; Pond 18 A: 2 Standpipes<br>Pond 9E: 1 Standpipe; Pond 16S: 4 Standpipes |
| Temporal Boundaries | The perimeter pipe monitoring frequency is based on the perimeter gas collection pipe PH3 concentration:<br>Perimeter Pipe PH3 Concentration — Monitoring Frequency<br>< 2,000 ppm (at ponds where gas extraction has not been required) — If triggered by exceedance of appurtenance monitoring action level(s)<br>2,000 – 9,999 ppm — Quarterly<br>10,000 – 13,999 ppm — Monthly<br>≥ 14,000 ppm — Monthly [2] |
| **Step 5 – Develop a Decision Rule** | |
| | During Perimeter Pipe Monitoring:<br>• If the screening-level calculated perimeter piping concentration of PH3 is ≤ 10,000 ppm using the GES system, then a direct PH3 sample of perimeter piping gas will be performed.<br>• If the calculated screening-level perimeter piping concentration of PH3 is > 10,000 ppm using the GES system, then that measurement will be recorded and the estimated concentration calculated using GES operating data and no further direct perimeter PH3 sample will be collected.<br><br>Result from Perimeter Pipe Monitoring: — Action:<br>< 2,000 ppm (at ponds where gas extraction has not been required) — Monitoring only if triggered by exceedance of appurtenance monitoring action level(s).<br>< 2,000 ppm (at ponds where gas extraction has been required) — Continue monitoring on frequency prescribed on Figure 3-2 of the *Plan*.<br>2,000 – 9,999 ppm — Initiate Quarterly monitoring if first result in range or continue Quarterly monitoring.<br>10,000 – 13,999 ppm — Initiate Monthly monitoring if first result in range or continue Monthly monitoring.<br>≥ 14,000 ppm — Initiate gas extraction and treatment within 10 days if first result ≥ 14,000 ppm or continue gas extraction and treatment and Monthly monitoring. |

**TABLE 1.2**
**DATA QUALITY OBJECTIVES – RCRA PONDS**
**Perimeter Gas Collection Pipe ("Standpipe") Monitoring**


| DQO Step | Pond Perimeter Piping Monitoring |
|---|---|
| **Step 6 – Specify Tolerable Limits on Decision Errors** | |
| | The propagated relative error for the calculation of source gas concentrations when using a GES unit for routine perimeter pipe monitoring and /or gas extraction and treatment is 15% (rounded up from 12.5%). As an added margin of safety, the propagated relative error was "doubled" to arrive at the 14,000 ppm PH3 (70 percent of the LEL that is approximately 20,000 ppm) for the perimeter pipe concentration that triggers gas extraction and treatment. |
| **Step 7 – Develop the Plan for Obtaining the Data** | |
| | The data collection design is described in Section 2.4 of the *Field Sampling Plan for RCRA Pond Gas Monitoring* (Appendix A-5 of the *RCRA Pond Post-Closure Plan*). |

NOTES:

[1] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

[2] GES unit(s) operating data (average calculated source gas) and monitoring (if multiple standpipes without operating GES at one or more standpipes).

**TABLE 1.3**
**DATA QUALITY OBJECTIVES – RCRA POND GAS MONITORING**
**Pond Perimeter and Cap Surface Scan Monitoring**
**(Page 1 of 2)**

| DQO Step | Pond Perimeter Surface Scan Monitoring | Pond Cap Surface Scan Monitoring |
|---|---|---|
| **Step 1 - State the Problem** | | |
| Problem Statement | PH3 may be accumulating beneath the RCRA final caps and migrating into the appurtenant post-closure systems at levels that could result in exposure of post-closure monitoring and maintenance (and other) personnel within the RCRA Ponds to PH3 levels above the OSHA permissible exposure limits (PELs). | |
| Planning Team | U.S. Environmental Protection Agency (EPA)<br>FMC Project Coordinator<br>FMC Gas Monitoring Contractors | |
| **Step 2 – Identify the Decision** | | |
| Principal Study Question | Are PH3 concentrations within the closed units and appurtenant post-closure systems at levels that require maintenance action to control, minimize, or eliminate post-closure escape of hazardous constituents to the atmosphere to the extent necessary to protect human health and the environment? | |
| **Step 3 – Identify Inputs to the Decision** | | |
| Physical Inputs | Meteorological and ground surface conditions.<br>Surface scan measurements collected from surface around RCRA pond perimeters. | Meteorological and ground surface conditions.<br>Surface scan measurements collected from entire RCRA pond cap surface. |
| Chemical Inputs | Air at 1 to 2 inches above the cap perimeter surface will be monitored for PH3 using a hand-held PH3 meter (Draeger Pac III [1]). | Air at 1 to 2 inches above the cap surface will be monitored for PH3 once using a hand-held PH3 meter (Draeger Pac III[1]). |
| Action Levels | 0.05 ppm (or greater) PH3 at perimeter surface. | 0.05 ppm (or greater) PH3 at pond cap surface. |
| **Step 4 – Define the Boundaries of the Study** | | |
| Spatial Boundaries | Sample location Figures 3-11 through 3-18 of the Plan.<br>Air monitored at 1 to 2 inches above pond cap perimeter surface within a 6-foot wide strip from the outside the cap HDPE anchor trench. | Sample location Figures 3-11 through 3-18 of the Plan.<br>Air monitored at 1 to 2 inches above pond cap surface within grid areas (“cells”) established on the pond surface. |
| Temporal Boundaries | If perimeter pipe PH3 concentrations are 10,000 ppm or greater, then perimeter surface monitoring will be performed monthly unless unacceptable meteorological and surface conditions (i.e., precipitation, snow accumulation, and/or average wind speeds of above 10 mph) exists throughout the month. | During acceptable meteorological and surface conditions (i.e., no precipitation, no snow accumulation, and average wind speeds of less than 10 mph), one sampling event any time perimeter surface scan equals or exceeds 0.05 ppm. |

**TABLE 1.3**
**DATA QUALITY OBJECTIVES – RCRA POND GAS MONITORING**
**Pond Perimeter and Cap Surface Scan Monitoring**
**(Page 2 of 2)**

| DQO Step | Pond Perimeter Surface Scan Monitoring | Pond Cap Surface Scan Monitoring |
|---|---|---|
| **Step 5 – Develop a Decision Rule** | | |
| | Perimeter Surface Scan Monitoring PH3 < 0.05 ppm<br>• No cap surface scan required.<br>• Continue monitoring on monthly schedule.<br>Perimeter Surface Scan Monitoring PH3 > 0.05 ppm<br>• Perform investigation of the source of the PH3 and pond cap surface scan monitoring.<br>• Perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial exceedance.<br>• Continue monitoring on monthly schedule. | Cap Surface Scan Monitoring PH3 < 0.05 ppm<br>• Continue perimeter and, if triggered, cap surface scan monitoring on monthly schedule.<br>Cap Surface Scan Monitoring PH3 > 0.05 ppm<br>• Perform investigation of the source of the PH3.<br>• Perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial exceedance.<br>• Continue perimeter and, if triggered, cap surface scan monitoring on monthly schedule. |
| **Step 6 – Specify Tolerable Limits on Decision Errors** | | |
| | Phosphine monitoring will be performed with the Draeger Pac III [1] (0 to 20 ppm range) that has a read-out that measures to two decimal places, i.e., 0.00 ppm. The instrument manufacturer states that the Draeger Pac III has an accuracy of ± 5% of the measured value or less. | |
| **Step 7 – Develop the Plan for Obtaining the Data** | | |
| | The data collection design is described in the Appendix A-5 *Field Sampling Plan for RCRA Pond Gas Monitoring* | |

NOTES:

[1] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

[2] The *RCRA Pond Area Work Rules* require that employees immediately relocate from a work area if PH3 concentrations in the working area reach or exceed 1.0 ppm. Sampling will be conducted only if conformance to these work rules can be achieved.

**TABLE 1.4**
**DATA QUALITY OBJECTIVES – RCRA POND GAS MONITORING**
**Contingent Fenceline Monitoring**
**(Page 1 of 2)**

| # | DQO Step | Data Quality Objectives |
|---|---|---|
| 1 | State the problem | An objective, systematic process is needed to measure and record phosphine concentrations at the northern fenceline of the FMC facility to evaluate whether phosphine concentrations could exceed risk-based human health screening levels in off-site areas potentially occupied by the public. |
| 2 | Identify the decision | Are concentrations of phosphine in ambient air at the facility boundary and along the Highway 30 right-of-way above a level that could pose a health risk to the public in areas outside the facility. |
| 3 | Identify inputs to the decision | • Industrial hygiene PH3 monitoring – any personnel alarm of 1.0 ppm PH3 or greater within the RCRA Ponds area.<br>• RCRA pond air release monitoring – any atmospheric reading $\geq$ 1.0 ppm PH3 is registered during RCRA pond appurtenance and/or perimeter surface and, if triggered, cap surface scan monitoring.<br>• Phosphine measurements at (9) northern fenceline monitoring stations.<br>• Phosphine measurements from five (5) off-site monitoring stations if triggered based on the nine (9) northern fenceline monitoring stations. |
| 4 | Define the study boundaries | Spatial<br>At the nine locations along the northern facility fenceline (Figure 2-3 of the *Gas Monitoring FSP*);<br>If triggered, at five locations on properties along the Highway 30 right-of-way north of the facility boundary.<br>Ambient air in the breathing zone (4 to 5 feet above ground level) and at ground level (4 to 6 inches above ground level).<br>Temporal<br>Immediate (initiate within 15 minutes) at the northern fenceline (Sites 1 – 9):<br>• If industrial hygiene monitoring results in a personnel alarm of 1.0 ppm PH3 or greater within the RCRA Ponds area.<br>• If any RCRA pond air release monitoring program atmospheric reading exceeds 1.0 ppm phosphine.<br>Immediate (initiate within 15 minutes) at the off site locations (Sites A – E) if northern fenceline monitoring (Sites 1 – 9) exceeds the trigger level. |

**TABLE 1.4**
**DATA QUALITY OBJECTIVES – RCRA POND GAS MONITORING**
**Contingent Fenceline Monitoring**


| # | DQO Step | Data Quality Objectives |
|---|---|---|
| 5 | Develop a decision rule | If (1) industrial hygiene monitoring results in a personnel alarm of 1.0 ppm PH3 or greater within the RCRA Ponds area; and/or (2) any RCRA pond air release monitoring program atmospheric reading $\geq$ 1.0 ppm phosphine; then immediately (initiate within 15 minutes) perform monitoring at the fenceline stations (Sites 1 through 9).<br>If PH3 concentrations are below 0.25 ppm at the 9 fenceline monitoring stations, discontinue contingent monitoring.<br>If PH3 concentrations exceed 0.25 ppm at any of the nine northern fenceline monitoring stations, then immediately (initiate within 15 minutes) proceed to monitor at the five off site monitoring stations.<br>If PH3 concentrations are below 0.25 ppm at the off-site stations, discontinue contingent monitoring.<br>If a phosphine measurement at any monitoring location along Highway 30 is $\geq$ 0.25 ppm, commence notification and evacuation procedures. |
| 6 | Specify limits on decision errors | Phosphine monitoring will be performed with the Draeger Pac III [1] (0 to 20 ppm range) that has a read-out that measures to two decimal places, i.e., 0.00 ppm. The instrument manufacturer states that the Draeger Pac III has an accuracy of ± 5% of the measured value or less. |
| 7 | Optimize the design for obtaining data | Contingent fenceline PH3 monitoring will be conducted as specified in Section 2.6 of the *Field Sampling Plan for RCRA Pond Gas Monitoring* (Appendix A-5 of the Plan). |

NOTES:

[1] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

# 2.0 DATA GENERATION AND ACQUISITION

This section provides requirements for field measurement of PH3 and data management. These requirements ensure that appropriate field monitoring equipment, sampling methods and quality control are employed and documented.

## 2.1 SAMPLING METHODS

All other sampling/measurements associated with the RCRA pond gas monitoring program will be performed in accordance with the procedures detailed in the *Gas Monitoring FSP* as included in Appendix A-5 of the Plan.

The majority of the PH3 monitoring will be performed using the Draeger Pac III hand-held gas monitor equipped with the DrägerSensor® XS Hydride (0-20 ppm) sensor. The Draeger Pac III with the (0 to 20 ppm range sensor) has a read-out that measures to two decimal places, i.e., 0.00 ppm. When using the Draeger Pac III with the 0-20 ppm sensor, all readings acquired will be recorded to the $100^{th}$ of a ppm (i.e., all digits shown on the meter readout) on the log sheet.

For monitoring where PH3 concentrations greater than 20 ppm are encountered (e.g., perimeter gas collection pipe monitoring), monitoring will be performed using the the Draeger Pac III hand-held gas monitor equipped with the DrägerSensor® XS $PH_3$ (0-1,000 ppm) sensor. The Draeger Pac III with the (0 to 1,000 ppm range sensor) has a read-out that measures to the nearest integer, i.e., 1 ppm. When using the Draeger Pac III with the 0-1,000 ppm sensor, all readings acquired will be recorded to the reported ppm (i.e., all digits shown on the meter readout) on the field form.

The instrument manufacturer states that the Draeger Pac III (both the 0-20 ppm and 0-1,000 ppm sensor) has an accuracy of ± 5% of the measured value or less. The Draeger Pac III Instructions for Use ("Users Manual") and Draeger specifications for the DrägerSensor® XS Hydride sensor are contained in Appendix A-5 (to the *Gas Monitoring FSP*).

Note that Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program that provide comparable or better performance.

As specified in the *Gas Monitoring FSP*, the following equipment will also be utilized in addition to the Draeger Pac III field monitor for the specified gas monitoring activities:

- Perimeter Gas Collection Pipe Monitoring - sample train (refer to Section 2.4.3 of the Gas Monitoring FSP); and
- Perimeter and Cap Surface Scan Monitoinrg – integrated sampler (refer to Section 2.5.2 of the Gas Monitoring FSP).

## 2.2 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

All equipment used in the conduct of this work will receive routine maintenance checks in order to minimize equipment breakdowns.

## 2.3 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

The Draeger manufacturer's specification for the DrägerSensor® XS Hydride (0-20 ppm) sensor states the calibration frequency as follows: Required = 6 months and Recommended = 3 months. However, FMC has implemented a 14-day calibration cycle that is substantially more aggressive than manufacturer's recommendation for the sensors. FMC will continue to perform calibration of the Draeger Pac III with XS Hydride sensor on a 14-day calibration cycle. The manufacturer's calibration procedures are contained in the Draeger Pac III Users Manual (see Appendix A-5B).

The requirements for field equipment calibration and frequency for the Draeger Pac III, perimeter gas collection pipe monitoring sample train (as specified in Section 2.4.3 of the *Gas Monitoring FSP*) and perimeter and cap surface scan integrated sampler (as specified in Section 2.5.2 of the *Gas Monitoring FSP*). All calibrations of field equipment will be recorded in log book(s) or on the field forms.

## 2.4 DATA MANAGEMENT

Data from the field monitoring program will be managed during implementation of the RCRA pond gas monitoring program. Field data will consist of field notebooks and field forms. Notebooks and field forms will be retained by the FMC Gas Monitoring Contractors until the end of each monitoring event, then forwarded to the FMC Project Coordinator for retention.

All information pertinent to the field activities will be entered directly into a field logbook and/or task-specific field forms. Information entered into the logbook will include:

- Monitor/Inspector's name(s).
- Date and time of inspection and monitoring.
- Monitoring location and description.
- Field observations and details important to interpreting the monitoring results (e.g., heavy rains, wind speed and direction, odors).
- Measurement data (e.g. monitored PH3 result).
- Any exceedance of an action level and corresponding actions.

The date(s) of monitoring (monitoring period) will be indicated in mm/dd/yy format, and the time will be indicated in accordance with the military convention. The monitored parameter will be indicated in an unambiguous shorthand.

# 3.0 Assessment/Oversight

Periodic surveillance of monitoring activities will be conducted. The surveillance will be conducted by the FMC Project Coordinator or his/her designee. The field surveillance will focus on adherence to standard procedures and will include field observation of sampling procedures and selected documentation. Field surveillance reports will be forwarded to the FMC Remediation Director. Audit findings which require corrective action and follow-up will be documented and tracked and will have resolution verified by the FMC Project Coordinator.

## 3.1 ASSESSMENTS AND RESPONSE ACTIONS

If it appears that field data are in error, the error(s) or potential error(s) will be documented and appropriate corrective action(s) will be taken. Corrective actions may include one or more of the following:

- Field monitoring measurements may be repeated to check the error,
- Calibrations may be checked and/or repeated, and/or
- Instrument/equipment may be replaced or repaired.

All field personnel will be responsible for identification of problems and implementation of corrective actions. During field activities, problem descriptions and corrective actions taken will be thoroughly detailed and entered onto field inspection forms or notebooks.

If the FMC Project Coordinator, FMC Gas Monitoring Contractors, or other project personnel become aware of any problems in field monitoring that cannot be corrected in the field, they will initiate formal corrective action. The FMC Project Coordinator will also be notified of problems identified and corrective actions taken during field activities. Appropriate corrective actions will be determined on a case-by-case basis.

## 3.2 REPORTS TO MANAGEMENT

The surveillance and audit findings will be included in a report to the FMC Remediation Director. Each report, as appropriate, will include a section which provides an overall assessment of the performance of the field programs based on the audits.

# 4.0 Data Review and Usability

The following subsections present requirements for activities that occur after field data collection is complete.

## 4.1 DATA REVIEW AND VERIFICATION REQUIREMENTS

The FMC Project Coordinator or designee will assess the usability of the data generated pursuant to the RCRA Pond Post-Closure Plan as follows:

- Review the quantitative field data (e.g., PH3 monitoring results) in terms of the DQOs as described in Tables 1.1 through 1.4 and consistency with prior results and any trends, as appropriate.

## 4.2 VERIFICATION METHODS

The required data review may be conducted informally as the field monitoring events are completed; it should include a comparison of the current and previous results, as appropriate. The data review will also include period checking (i.e., independent calculation) of the calculated PH3 concentration from the perimeter gas collection pipe monitoring sample train (screening – level and second level calculated perimeter pipe PH3 concentration per Sections 2.4.4.1 and 2.4.4.2 of the *Gas Monitoring FSP*).

## 4.3 RECONCILIATION WITH USER REQUIREMENTS

The project objectives specified in Section 1.5 will be met if sufficient data of known quality have been generated during the on-going implementation of the gas monitoring program as described in Section 3 of the Plan and procedures detailed in the Gas Monitoring FSP. If insufficient data of known quality have been generated (i.e., "missed" or incomplete monitoring), then the project objectives have not been met and corrective action will be required. Appropriate corrective actions will be determined on a case-by-case basis but would likely include re-measurement (re-monitoring).

# 5.0 References

EPA, 2000. "Guidance for the Data Quality Process, EPA QA/G-4, EPA/600/R-96/055, August 2000.

EPA, 2001. "EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, EPA/240/B-01/003, March 2001.

EPA, 2002. "Guidance for Quality Assurance Project Plans, EPA QA/G-5, December 2002.

EPA, 2006. "Guidance on Systematic Planning Using the Data Quality Objectives Process, EPA QA/G-4, February 2006.

# APPENDIX A-5

# Field Sampling Plan for RCRA Pond Gas Monitoring

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## APPENDICES

Appendix



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## FIGURES

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# Section 1
# INTRODUCTION

## 1.1 PROJECT BACKGROUND

The post-closure phosphine (PH3) monitoring program was developed utilizing over 2 years of gas monitoring data at the RCRA ponds obtained pursuant to the RCRA Pond Unilateral Administrative Order for Removal Actions (UAO, EPA, 2010b). The prior RCRA Pond gas monitoring program, monitoring data, evaluation of that data and recommendations that led to the RCRA Pond post-closure phosphine (PH3) monitoring program are not described herein and can be found in the following documents:

- RCRA Pond Phosphine Assessment Study Work Plan – Final, November 2010, Revised July 2011;
- RCRA Pond Phosphine Assessment Study Report, January 2012;
- Technical Memorandum - First Quarter 2012 Update for Ponds 16S and 18A - RCRA Pond Phosphine Assessment Study, April 11, 2012;
- Technical Memorandum - Second Quarter 2012 Update for Ponds 16S and 18A - RCRA Pond Phosphine Assessment Study; July 16, 2012;
- Framework for Post-Closure Phosphine Monitoring, RCRA Ponds, FMC Facility, Pocatello, ID." July 16, 2012;
- FMC Response to EPA Draft Comments on FMC's July 16, 2012, Framework for Post-Closure Phosphine Monitoring, RCRA Ponds, FMC Facility, Pocatello, ID, October 16, 2012; and
- Final Update to the RCRA Pond Phosphine Assessment Study Report, XXXX.

## 1.2 PROJECT OBJECTIVES

The overall objective of the RCRA Pond gas monitoring program is the effective and timely detection of gas concentrations within the closed units and appurtenant post-closure systems at levels that require maintenance action, additional monitoring, and/or initiation of gas extraction and treatment to control, minimize, or eliminate post-closure escape of hazardous constituents to the atmosphere to the extent necessary to protect human health and the environment. A coequal objective is the effective and timely detection of gas concentrations within the closed units and appurtenant post-closure systems at levels that require maintenance action, additional monitoring, and/or initiation of gas extraction and treatment to protect and preserve the closure cover and post-closure monitoring systems ("post-closure infrastructure").

In order to protect post-closure monitoring and maintenance (and other) personnel within the RCRA Ponds area, the OSHA Permissible Exposure Limits (PELs) for were used to guide development of the gas monitoring program and specifically the triggers for 1) corrective maintenance, 2) additional monitoring and 3) initiation of gas extraction and treatment.

| Summary of Phosphine Exposure Limits | |
|---|---|
| Permissible Exposure Limit (PEL) | 0.3 ppm |
| Short-Term Exposure Limit (STEL) | 1.0 ppm |
| Immediately Dangerous to Life or Health (IDLH) | 50 ppm |

In order to protect and preserve the closure cover and post-closure monitoring systems ("post-closure infrastructure"), the Lower Explosive Limit (LEL) for PH3 of approximately 20,000 ppm was used to develop the gas monitoring program and specifically the trigger for initiation of gas extraction and treatment. After reviewing the propagated relative error for the calculation of source gas concentrations when using a GES unit for routine perimeter pipe monitoring and /or gas extraction and treatment, the propagated relative error is 15% (rounded up from 12.5%). As an added margin of safety, FMC "doubled" the propagated relative error to arrive at the 14,000 ppm PH3 (70 percent of the LEL) for the perimeter pipe concentration that triggers gas extraction and treatment.

## 1.3 PROJECT ORGANIZATION

The key personnel associated with the implementation of this *Field Sampling Plan for RCRA Pond Gas Monitoring* ("*Gas Monitoring FSP*") and associated responsibilities presented in the following subsections.

### 1.3.1 FMC Remediation Director

The FMC Remediation Director is responsible for overall program execution and quality. The remediation director is ultimately responsible for the quality of the data collected and for the interpretations of these data that will be presented to the data users.

### 1.3.2 FMC Project Coordinator

The FMC Project Coordinator is responsible for managing specific field activities (e.g. gas monitoring) including direct management of field contractors. Also responsible for

assembly, organization and maintenance of all information collected during monitoring activities.

### 1.3.3 FMC Gas Monitoring Contractors

The gas monitoring contractors are responsible for the collection and reporting of field data relevant to monitoring and data management. The gas monitoring contractors are also responsible for maintenance of the gas monitoring records.

## 1.4 DOCUMENT ORGANIZATION

The remainder of this *Gas Monitoring FSP* consists of:

- **Section 2.0 Gas Monitoring Program Procedures.** Includes a summary of the gas monitoring program structure and the procedures for field implementation of the gas monitoring program.
- **Section 3.0 General Gas Monitoring Program Methods and Procedures.** Includes elements that are common to the gas monitoring program. Examples of common elements include field documentation procedures, reporting and recordkeeping, equipment decontamination and waste management and disposal.
- **Appendix A-5A SOPs and Instructions for Sampling Equipment.**
- **Appendix A-5B Draeger Pac III Field Instrument Information.**

# Section 2
# GAS MONITORING PROGRAM PROCEDURES

The following subsections provide a description of the structure and the procedures for field implementation of the post-closure gas monitoring program for the RCRA Ponds.

## 2.1 DATA QUALITY OBJECTIVES

The DQOs for the post-closure gas monitoring activities are presented on Tables 1.1, 1.2, 1.3 and 1.4 of the *RCRA Pond Quality Assurance Project Plan for Gas Monitoring* ("*Gas Monitoring QAPP"*) (Appendix A-4 of the *RCRA Pond Post-Closure Plan (*"Plan*"*).

## 2.2 GAS MONITORING PROGRAM STRUCTURE

The gas monitoring program is structured to account for the status of the RCRA Ponds during implementation of this monitoring program:

1. Ponds (8S, 8E, 9E and the Phase IV ponds) with PH3 concentrations beneath the closure cover system (based on historic monitoring data) that have not previously required operation of a gas extraction and treatment system(s); and
2. Ponds (15S, 16S, 17 and 18A) with PH3 concentrations beneath the closure cover system where operation of a gas extraction and treatment system(s) were required under EPA Unilateral Administrative Order (UAO) for Removal Action CERCLA Docket No. CERCLA 10-2007-0051 ("Pond 16S UAO," EPA 2007) and EPA Unilateral Administrative Order for Removal Action CERCLA Docket 10-2010-0170 ("RCRA Pond UAO," EPA 2010b).

For the RCRA Ponds in status 1 above, the gas monitoring program is summarized on Figure 3-1 of the Plan. As shown on Figure 3-1, the gas monitoring program is structured with multiple decision points where the results of the monitoring are compared to action levels (or triggers), and, if a monitoring result(s) exceed(s) the specified action level(s), specifies additional actions including maintenance, additional monitoring and initiation of gas extraction and treatment. Note that if a monitoring result(s) for a RCRA Pond in status 1 exceed(s) the action level(s) that requires perimeter pipe monitoring and the perimeter pipe PH3 concentration is found to be greater than 2,000 ppm and/or gas extraction and treatment, then the monitoring program for that pond changes to the program structured for ponds in status 2 above.

For the RCRA Ponds in status 2 above, the gas monitoring program is summarized on Figure 3-2 and Table 3-1 of the Plan. Figure 3-2 shows the frequency and action levels for perimeter pipe monitoring that is structured based on PH3 concentration ranges in the perimeter pipe. Table 3-1 shows the monitoring program frequency, action levels and

actions associated with the perimeter pipe PH3 concentration ranges. The gas monitoring activities, frequency, action levels and response actions summarized on Figures 3-1 and 3-2 and Table 3-1 are described in greater detail in Section 3.2 of the Plan and in Section 2.3 of this *Gas Monitoring FSP*.

## 2.3 POND APPURTENANCE GAS MONITORING PROCEDURES

The appurtenance gas monitoring program is summarized on Table 3-2 of the Plan and the appurtenance monitoring locations at each RCRA pond are shown on Figures 3-3 to 3-10 in the Plan. The appurtenance gas monitoring schedule, action levels and field procedures are described in the subsections below.

### 2.3.1 Appurtenance Monitoring Schedule

The appurtenance monitoring frequency is based on the perimeter pipe PH3 concentration and results of on-going appurtenance monitoring as follows:

| Perimeter Pipe PH3 Concentration | Monitoring Frequency |
|---|---|
| < 2,000 ppm | Quarterly / Annually |
| 2,000 – 9,999 ppm | Quarterly |
| 10,000 – 13,999 ppm | Monthly |
| ≥ 14,000 ppm | Monthly |

For RCRA Ponds with perimeter pipe PH3 concentrations below 2,000 ppm, the appurtenance monitoring will initially be performed on a quarterly basis. If there are no PH3 detections at or above the PH3 action levels for three (3) consecutive quarters of monitoring, the frequency will be reduced to annually for that pond. If there is a PH3 detection above the action levels during annual monitoring, the monitoring will return to quarterly (or other frequency corresponding to the perimeter pipe PH3 concentration). For RCRA Ponds with perimeter pipe PH3 concentrations greater than 2,000 ppm, the appurtenance monitoring remains at the specified frequency until the perimeter pipe PH3 concentration either drops below 2,000 ppm (frequency decreases to quarterly / annually) or increases to a higher range (e.g., from the range between 2,000 and 9,999 ppm to the range between 10,000 and 13,999 ppm, the monitoring frequency increases from quarterly to monthly).

### 2.3.2 Appurtenance Monitoring Action Levels and Responses

The action levels for appurtenance monitoring are:

Air or Leak Detection Monitoring PH3: $\geq$ 0.05 ppm

Inside Monitoring PH3: $\geq$ 0.3 ppm, $\geq$ 1.0 ppm and $\geq$ 35 ppm

The responses related to these action levels are described below:

Air or Leak Detection Monitoring PH3 > 0.05 ppm or Inside Monitoring PH3 > 0.3 ppm

- Perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial exceedance.
- If air or leak detection re-monitoring < 0.05 ppm and/or inside re-monitoring < 0.3 ppm, re-monitor location(s) of exceedance(s) one month from initial exceedance.
- If air or leak detection re-monitoring $\geq$ 0.05 ppm and/or inside re-monitoring $\geq$ 0.3 ppm, perform maintenance and re-monitor location(s) of exceedance(s) within 10 days from initial (or re-monitoring) exceedance.
- If three consecutive results of air or leak detection re-monitoring $\geq$ 0.05 ppm and/or inside re-monitoring $\geq$ 0.3 ppm, monitor perimeter gas collection standpipe within 10 days.

Inside Monitoring PH3 > 1.0 ppm

- Perform maintenance and re-monitoring per actions for Inside Monitoring $\geq$ 0.3 ppm above.
- Monitor perimeter gas collection standpipe(s) within 10 days – change frequency of monitoring if indicated by perimeter pipe PH3 concentration.

Inside Monitoring PH3 > 35 ppm

- Begin gas extraction and treatment within 10 days – change frequency of monitoring based on perimeter pipe PH3 concentration (GES operating data or perimeter pipe monitoring) or increase PH3 mass removal rate if gas extraction and treatment in progress.

In addition to the above action levels, individuals performing RCRA pond appurtenance monitoring will be equipped with an industrial hygiene PH3 monitor, set to alarm at 0.3 ppm and 1.0 ppm as indicated in the *RCRA Pond Area Work Rules*. Any industrial hygiene alarm of 0.3 ppm PH3 in air (indicating PH3 concentrations in air of 0.3 to 0.99 ppm) that occur will trigger an investigation of the source, extent, and potential corrective

action provided that these measures can be safely performed. Any air monitoring reading of 1.0 ppm PH3 or greater in air will also trigger an immediate (initiate within 15 minutes of such reading) round of fenceline monitoring at facility boundary monitoring sites 1 through 9, as described in Section 3.2.4 of the Plan and Section 2.6 of Appendix A-5 Field Sampling Plan for RCRA Pond Gas Monitoring. Note that for RCRA pond appurtenance monitoring, fenceline monitoring is not triggered solely by leak detection results at 1 to 2 inches from the appurtenance or inside appurtenance that show 1.0 ppm PH3 or greater.

### 2.3.3 Appurtenance Monitoring Locations and General Procedures

RCRA pond cap appurtenances that will be monitored for potential PH3 are:

- *TMP Enclosures* – TMP enclosures are present on all of the RCRA ponds.
- *ET Cap Drainage Sumps* – ET cap drainage collection sumps are present at Ponds 8S, 11S, 12S, 13S, 14S, 15S, 16S and 18A.
- *LCDRS Collection Sumps* – Leachate Collection, detection and Removal System (LCDRS) sumps are present at Ponds 8E, 9E, 15S, 16S, 17, and 18A.
- *Instrument Panels* – "Instrument panel" is a generalized term for the steel enclosures that house (1) pressure and temperature data displays / recording modules, (2) pressure and temperature system audible / visual alarms if separate from the data display housing and (3) power supply / switches that are present at all of the RCRA ponds.
- *Perimeter Piping Standpipes* – Each of the RCRA pond cover systems is equipped with perforated perimeter piping installed immediately under the GCL/HDPE cap liner.

Monitoring for PH3 at RCRA pond appurtenances will include:

- *Air monitoring* – monitoring around the appurtenance at a distance of approximately 12 inches to determine whether, and to what extent, PH3 has been released to the air.
- *Leak detection* – monitoring around the appurtenance at a distance of approximately 1 to 2 inches from potential leakage points.
- *Inside* – monitoring inside appurtenance at a depth of approximately 1.5 feet inside TMP enclosures, 3 to 4 feet inside ET Cap Drainage and LCDRS sumps, and 6-inches inside instrument panels.

For all appurtenance air monitoring, including leak detection and air monitoring, the PH3 measurement will be made using the Draeger Pac III field instrument[1] (0 to 20 ppm measurement range or 0-1,000 range if inside appurtenance > 20 ppm). Draeger Pac III field instrument standard operating procedures (SOPs), instructions, and calibration procedures are included in Appendix 4-5B. The Draeger Pac III monitor will be calibrated every 14 days per these procedures. The Draeger Pac III field instrument low-level alarm used for the appurtenance air monitoring will be set to alarm at 0.3 ppm and the high-level alarm will be set to alarm at 1.0 ppm. However, direct reading of the PH3 concentration will be made and recorded during the appurtenance air monitoring, even when the readings are below the alarm levels.

The following general procedure applies to all RCRA pond appurtenance air monitoring. Specific procedures for each type of appurtenance follow this general procedure.

1. Note that all RCRA ponds are within the RCRA Pond Area and *RCRA Pond Area Work Rules* will apply to all persons entering this area. Also note, while PH3 is not expected in ambient air at these locations, sampling personnel will follow the procedures in the *RCRA Pond Area Work Rules* if PH3 is detected at the breathing zone.

2. Ensure that the Draeger Pac III has been calibrated within the past 14 days. Also ensure that the Draeger Pac III field instrument low-level alarm has been set to 0.3 ppm and the high-level alarm has been set to 1.0 ppm.

3. Approach the appurtenance from the upwind direction, if possible, with a Draeger Pac III field instrument (0 to 20 ppm range) measuring ambient air PH3 concentrations. Check and record the PH3 concentration at the breathing zone (approximately 4 to 5 feet above the ground surface). Record the concentration, the barometric pressure and other weather observations. All industrial hygiene PH3 monitor alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading and location. An investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm and potential corrective action, once those measures can be safely performed. In addition, any air monitoring reading of 1.0 ppm PH3 or greater in air will trigger an immediate (initiate within 15 minutes of such reading) round of "fenceline" monitoring for PH3 at the nine fenceline monitoring locations (sites 1 through 9), following procedures as provided in Section 2.6 below.

[1] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

### 2.3.4 TMP Enclosure Gas Monitoring Procedures

Air, leak detection and inside monitoring will be performed at each RCRA pond TMP. The following lists the number of TMPs at each RCRA pond:

- Pond 8S has 4 TMPs (see Figure 3-3 of the Plan)
- Pond 8E has 4 TMPs (see Figure 3-4 of the Plan)
- Pond 9E has 10 TMPs (see Figure 3-5 of the Plan)
- Phase IV Ponds have 13 TMPs (see Figure 3-6 of the Plan)
- Pond 15S has 10 TMPs (see Figure 3-7 of the Plan)
- Pond 16S has 8 TMPs (see Figure 3-8 of the Plan)
- Pond 17 has 6 TMPs (see Figure 3-9 of the Plan)
- Pond 18A has 3 TMPs (see Figure 3-10 of the Plan)

#### 2.3.4.1 TMP Air Monitoring

1. Follow the general appurtenance air monitoring procedure steps 1 through 3 above.

2. With the TMP lid closed, hold the Draeger Pac III field instrument at approximately 12 inches from lid seal and at the same level as the top of TMP enclosure. While keeping the Draeger Pac III field instrument at approximately 12 inches away from the TMP enclosure lid seal, pass around the TMP enclosure, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm. At any point during the TMP air monitoring, if the Draeger Pac III alarms, note *the level of PH3. If less than 1.0 ppm* PH3, continue the TMP air monitoring measurements. If the level is 1.0 ppm or greater PH3, move upwind until out of the PH3 (0.5 ppm or less) and follow the procedures as outlined in the *RCRA Pond Area Work Rules*. All industrial hygiene or TMP air monitoring PH3 alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading. An investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm and potential corrective action once, once those measures can be safely performed.

3. Proceed to the TMP Leak Detection Monitoring (if PH3 levels allow per the *RCRA Pond Area Work Rules*).

#### 2.3.4.2 TMP Leak Detection Monitoring

Note that at the Pond 16S TMP enclosures, the appurtenance leak detection monitoring includes the sample ports, condensate drain valve and/or maintenance access ports on the Gas Extraction and Treatment System (GETS) piping from the TMP enclosure penetration to the solenoid valve.

1. With the TMP lid closed, hold the Draeger Pac III field instrument approximately 1 to 2 inches from the base of the TMP enclosure (where the enclosure sets on the concrete foundation). While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the TMP enclosure, pass around the TMP enclosure base, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

2. With the TMP lid closed, hold the Draeger Pac III field instrument at approximately 1 to 2 inches from lid seal at the top of TMP enclosure. While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the TMP enclosure lid seal, pass around the TMP enclosure, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

3. With the TMP lid closed, hold the Draeger Pac III field instrument at approximately 1 to 2 inches from any other TMP enclosure openings (e.g., TMP sample line exit point). While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the opening, note the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

4. Proceed to the Inside TMP Monitoring (if PH3 levels allow per the *RCRA Pond Area Work Rules*).

#### 2.3.4.3 Inside TMP Monitoring

1. If either the air or leak detection monitoring outside the appurtenance results in a measurement of 1.0 ppm or greater, do not open the appurtenance or attempt to perform the monitoring inside the appurtenance.

2. Open the TMP enclosure lid while holding the Draeger Pac III field instrument at the breathing level outside of the enclosure. If the 1.0 ppm alarm sounds while measuring the breathing level outside the TMP enclosure, close the TMP enclosure lid and relocate to an area where PH3 readings are below 0.3 ppm. Do not proceed with sampling inside the TMP enclosure.

3. With the TMP lid open, extend the Draeger Pac III field instrument to a depth of approximately 1.5 feet into the TMP enclosure. Allow the instrument to stabilize and then record the instrument reading.

4. Close and secure the TMP enclosure lid.

### 2.3.5 ET Cap Sump and LCDRS Sump Gas Monitoring Procedures

Air, leak detection and inside monitoring will be performed at each RCRA pond ET cap sump and LCDRS sump. The following lists the number of sumps at each RCRA pond:

- Pond 8S has 2 ET cap drainage sumps and no LCDRS sumps
- Pond 8E has no ET cap drainage sumps and 1 LCDRS sump
- Pond 9E has no ET cap drainage sumps and 6 LCDRS sumps
- Phase IV Ponds have 4 ET cap drainage sumps and no LCDRS sumps
- Pond 15S has 2 ET cap drainage sumps and 4 LCDRS sumps
- Pond 16S has 2 ET cap drainage sumps and 2 LCDRS sumps
- Pond 17 has no ET cap drainage sumps and 1 LCDRS sump
- Pond 18A has 2 ET cap drainage sumps and 1 LCDRS observation pipe (with dedicated pump and wiring located within the observation pipe).

The locations of the ET cap drainage sumps and LCDRS sumps are shown on Figures 3-3 through 3-10 of the Plan.

#### 2.3.5.1 ET Cap Sump and LCDRS Sump Air Monitoring

1. Follow the general appurtenance air monitoring procedure steps 1 through 3 above.

2. With the sump lid closed, hold the Draeger Pac III field instrument at approximately 12 inches from the sump lid seal at the same level as the top of the sump. While keeping the Draeger Pac III field instrument at approximately 12 inches away from the sump lid seal, pass around the inspection hatch or lid of the sump, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm. At any point during the sump air monitoring, if the Draeger Pac III alarms, note the level of PH3. If less than 1.0 ppm PH3, continue the sump air monitoring measurements. If the level is 1.0 ppm or greater PH3, move upwind until out of the PH3 (0.5 ppm or less) and follow the procedures as outlined in the *RCRA Pond Area Work Rules*. All industrial hygiene or sump air monitoring PH3 alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading. An investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm and potential corrective action, once those measures can be safely performed.

3. Proceed to the sump enclosure air monitoring (if PH3 levels allow per the *RCRA Pond Area Work Rules*).

### 2.3.5.2 ET Cap Sump and LCDRS Sump Leak Detection Monitoring

1. With the sump closed, hold the Draeger Pac III field instrument approximately 1 to 2 inches from the base of the sump (where the sump meets the ground surface). While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the sump, pass around the sump base, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

2. With the sump lid closed, hold the Draeger Pac III field instrument at approximately 1 to 2 inches from the sump lid seal at the top of the sump. While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the sump lid seal, pass around the TMP enclosure, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

3. With the inspection hatch or lid of the sump closed, hold the Draeger Pac III field instrument at approximately 1 to 2 inches from any other sump openings (e.g., sump overflow). While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the opening, note the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

### 2.3.5.3 Inside ET Cap Sump and LCDRS Sump Monitoring

1. If either the air or leak detection monitoring outside the appurtenance results in a measurement of 1.0 ppm or greater, do not open the appurtenance or attempt to perform the monitoring inside the appurtenance.

2. Open the sump inspection lid while holding the Draeger Pac III field instrument at the breathing level outside of the sump. If the 1.0 ppm alarm sounds while measuring the breathing level outside the sump, close the sump inspection lid and move relocate to an area where PH3 readings are below 0.3 ppm. Do not proceed with sampling inside the sump.

3. With the sump inspection lid open, lower the Draeger Pac III field instrument to a depth approximately 3-4 feet from the top of the sump and then take/record the reading. Note that for Pond 18A, the LCDRS sump is designed with an observation pipe instead of a sump. For this LCDRS, the Draeger Pac III field instrument reading will be taken at the top of the pipe as the instrument cannot be lowered into the pipe.

4. Close and secure the sump inspection lid.

### 2.3.6 Instrument Panel Gas Monitoring Procedures

Air monitoring will be performed at each RCRA pond instrument. The following lists the number of instrument panels at each RCRA pond:

- Pond 8S has 4 instrument panels (see Figure 3-3 of the Plan)
- Pond 8E has 1 instrument panel (see Figure 3-4 of the Plan)
- Pond 9E has 2 instrument panels (see Figure 3-5 of the Plan)
- Phase IV Ponds have 5 instrument panels (see Figure 3-6 of the Plan)
- Pond 15S has 3 instrument panels (see Figure 3-7 of the Plan)
- Pond 16S has 5 instrument panels (see Figure 3-8 of the Plan)
- Pond 17 has 2 instrument panels (see Figure 3-9 of the Plan)
- Pond 18A has 4 instrument panels (see Figure 3-10 of the Plan)

The instrument panels associated with the discontinued temperature and pressure monitoring are no longer used to acquire / display temperature or pressure data. FMC will continue to perform instrument panel gas monitoring at these panels per the Plan and this section of the *Gas Monitoring FSP*. FMC may submit a plan to EPA to disconnect and remove these instrument panels. Upon EPA approval, the panels will be removed and will be eliminated from the instrument panel gas monitoring.

#### 2.3.6.1 Instrument Panel Air Monitoring

1. Follow the general appurtenance air monitoring procedure steps 1 through 3 above.

2. With the instrument panel door closed, hold the Draeger Pac III field instrument approximately 12 inches horizontally out from the bottom of the instrument panel door. While keeping the Draeger Pac III field instrument at approximately 12 inches away from the panel door, pass horizontally around the instrument panel, noting the maximum PH3 concentration and the general area (e.g., NW corner) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm. At any point during the instrument panel air monitoring, if the Draeger Pac III alarms, note the level of PH3. If less than 1.0 ppm PH3, continue the instrument panel air monitoring measurements. If the level is 1.0 ppm or greater PH3, move upwind until out of the PH3 (0.5 ppm or less) and follow the procedures as outlined in the *RCRA Pond Area Work Rules*. All industrial hygiene or instrument panel air monitoring PH3 alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading. An investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm, the extent of the PH3 release (including monitoring of adjacent low-lying areas per the procedure in Section 2.5), and potential corrective action, once those measures can be safely performed.

#### 2.3.6.2 Instrument Panel Leak Detection Monitoring

1. With the instrument panel door closed, hold the Draeger Pac III field instrument approximately 1 to 2 inches from the door seal. While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the panel door, pass around the door seal, noting the maximum PH3 concentration and the general area (e.g., top) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

2. With the instrument panel door closed, hold the Draeger Pac III field instrument at approximately 1 to 2 inches from conduit connections on the outside of the instrument panel. While keeping the Draeger Pac III field instrument at approximately 1 to 2 inches away from the conduit connection, note the maximum PH3 concentration on the field sampling form. If the reading is 0.00 ppm, so note on the field sampling form.

3. Proceed to the inside instrument panel monitoring (if PH3 levels allow per the *RCRA Pond Area Work Rules*).

#### 2.3.6.3 Inside Instrument Panel Monitoring

1. Open the instrument panel door while holding the Draeger Pac III field instrument at the breathing level outside of the enclosure. If the 1.0 ppm alarm sounds while measuring the breathing level outside the instrument panel, close the panel door and move relocate to an area where PH3 readings are below 0.3 ppm. Do not proceed with sampling inside the instrument panel.

2. With the instrument panel door open just far enough, extend the Draeger Pac III field instrument approximately 6 inches into the instrument panel. Allow the instrument to stabilize and then record the instrument reading.

3. Close and secure the instrument panel door.

### 2.3.7 Perimeter Pipe Standpipe Air and Leak Detection Monitoring Procedures

Air monitoring will be performed at each RCRA pond perimeter piping standpipe. The following lists the number of perimeter piping standpipes at each RCRA pond:

- Pond 8S has 1 standpipe (see Figure 3-3 of the Plan)
- Pond 8E has 1 standpipe (see Figure 3-4 of the Plan)
- Pond 9E has 1 standpipe (see Figure 3-5 of the Plan)
- Phase IV Ponds 4 standpipes (see Figure 3-6 of the Plan)
- Pond 15S has 2 standpipes (see Figure 3-7 of the Plan)

- Pond 16S has 4 standpipes (see Figure 3-8 of the Plan)
- Pond 17 has 5 standpipes (see Figure 3-9 of the Plan)
- Pond 18A has 2 standpipes (see Figure 3-10 of the Plan)

#### 2.3.7.1 Perimeter Pipe Standpipe Air Monitoring

1. Follow the general appurtenance air monitoring procedure steps 1 through 3 above.

2. Hold the Draeger Pac III field instrument approximately 12 inches horizontally from the termination of the standpipe (typically where the valve is at the end of the standpipe). While keeping the Draeger Pac III field instrument at approximately 12 inches away from the standpipe, pass horizontally around the standpipe, noting the maximum PH3 concentration and the general area (e.g., NW) of the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm. At any point during the standpipe air monitoring, if the Draeger Pac III alarms, note the level of PH3. If less than 1.0 ppm PH3, continue the standpipe air monitoring measurements. If the level is 1.0 ppm or greater PH3, move upwind until out of the PH3 (0.5 ppm or less) and follow the procedures as outlined in the *RCRA Pond Area Work Rules*. All industrial hygiene or standpipe air monitoring PH3 alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading. An investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm and potential corrective action, once those measures can be safely performed.

#### 2.3.7.2 Perimeter Pipe Standpipe Leak Detection Monitoring

1. Hold the Draeger Pac III field instrument approximately 1 to 2 inches from the base of the standpipe (where the standpipe exits the ground). Note the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

2. Hold the Draeger Pac III field instrument at approximately 1 to 2 inches from the valve outlet and piping flanges/joints. Note the maximum PH3 concentration on the field sampling form, including if the maximum is 0.00 ppm.

## 2.4 POND PERIMETER GAS COLLECTION PIPING GAS MONITORING PROCEDURES

The pond perimeter gas collection piping gas monitoring schedule, action levels and field procedures are described in the subsections below.

### 2.4.1 Pond Perimeter Gas Collection Piping Monitoring Schedule, Action Levels and Responses

The perimeter pipe monitoring frequency is based on the perimeter pipe PH3 concentration and action levels (concentration ranges) as follows:

| Perimeter Pipe PH3 Concentration | Monitoring Frequency |
|---|---|
| < 2,000 ppm (at ponds where gas extraction has not been required) | If triggered by exceedance of appurtenance monitoring action level(s) |
| 2,000 – 9,999 ppm | Quarterly |
| 10,000 – 13,999 ppm | Monthly |
| ≥ 14,000 ppm | Monthly [1] |

[1] GES unit(s) operating data (average calculated source gas) and monitoring (if multiple standpipes without operating GES at one or more standpipes).

As shown on Figure 3-2 of the Plan, when the monitored perimeter pipe PH3 concentration is 2,000 ppm or greater (based on highest perimeter pipe standpipe concentration at ponds with multiple standpipes), the perimeter pipe monitoring frequency can either increase, remain at the same frequency or decrease based on subsequent monitoring results or GES operating data if gas extraction and treatment has been initiated at the pond. Once routine perimeter pipe monitoring has been initiated due to a monitoring result of 2,000 ppm or greater, the perimeter pipe monitoring program requires a minimum of 4 years of perimeter pipe monitoring and only if the subsequent perimeter pipe monitoring results are consistently below 2,000 ppm. An example of the decreasing perimeter pipe monitoring frequency schedule is provided in Section 3.2.2 of the Plan.

Gas extraction and treatment will begin within 10 days at a RCRA pond(s) when the perimeter gas collection pipe PH3 concentration is greater than or equal to 14,000 ppm as measured at the highest (if multiple) standpipe. Gas extraction and treatment system operations and maintenance is described in Section 4 of the Plan and detailed procedures are contained in Appendix A-6 GES Unit Operation and Maintenance Manual of the Plan.

### 2.4.2 Pond Perimeter Gas Collection Piping Monitoring Locations

The perimeter gas collection pipe will monitored utilizing a GES unit connected to the perimeter gas collection piping outlet(s) (“standpipe(s)”). Seven of the RCRA ponds have a single standpipe and the other four have multiple standpipes:

- Pond 8S: 1 Standpipe (see Figure 3-3 of the Plan)
- Pond 8E: 1 Standpipe (see Figure 3-4 of the Plan)
- Pond 9E: 1 Standpipe (see Figure 3-5 of the Plan)
- Phase IV: 4 Standpipes (one each at 11S, 12S, 13S and 14S) (see Figure 3-6 of the Plan)
- Pond 15S: 2 Standpipes (see Figure 3-7 of the Plan)
- Pond 16S: 4 Standpipes (see Figure 3-8 of the Plan)
- Pond 17: 5 Standpipes (see Figure 3-9 of the Plan)
- Pond 18 A: 2 Standpipes (see Figure 3-10 of the Plan)

The locations of the perimeter gas collection piping standpipes are shown on Figures 3-3 to 3-10 in the *Plan*. At ponds that have multiple standpipes, each of the standpipes will be monitored when the perimeter gas collection pipe monitoring is performed. If after five (5) years of monitoring, one of the standpipes is consistently measured with the highest PH3 concentration compared to the other standpipes, FMC may request and, upon EPA approval, monitoring would only be performed at the standpipe with the highest PH3 concentration thereafter.

### 2.4.3 Sampling Train Calibration Prior to the Perimeter Piping Monitoring Event

Calibrate Draeger PAC III PH3 Monitor: The Draeger PAC III field monitor[2] (0 to 1,000 ppm) will have been calibrated with 500 ppm PH3 standard calibration gas (see calibration procedure included in Appendix A-5B) within 14 days prior to any perimeter piping monitoring event.

Calibrate Sample Train: Also, within 14 days prior to any perimeter piping sampling event, the sampling train will be calibrated using 500 ppm PH3 standard calibration gas and using various dilution ratios (N2 to PH3) to confirm the accuracy of the dilution manifold.

[2] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

To avoid release of PH3 to the environment, the PH3 calibration gas used in this calibration procedure will be collected in a Tedlar bag. The Tedlar bag will then be discharged to an operating GES for treatment prior to release to atmosphere.

The perimeter piping sampling train calibration procedure follows:

1. Calibrate the Draeger PAC III PH3 monitor.
2. Position perimeter piping sampling train in the sampling lab. The equipment includes:
    - Gas dilution manifold
    - High-range (0 to 1,000 ppm) Draeger PAC III PH3 monitor equipped with a Draeger calibration cap.
    - Nitrogen gas cylinder for sample dilution
    - PH3 calibration gas cylinder (500 ppm)
    - Tedlar bag for the collection of gas discharged from the Draeger PAC III monitor.
    - Mass flow meters in the dilution manifold indicate the flow rate of calibration gas and dilution gas (nitrogen). The combined total flow of the PH3 calibration gas and any nitrogen dilution gas should be approximately 500 SCCM. This is the flow for which the Draeger PAC III calibration cap is designed.
3. Connect the nitrogen dilution gas to the designated flow meter on the manifold.
4. Connect the PH3 calibration gas to the designated flow meter on the manifold.
5. Connect the Draeger PAC III PH3 monitor (0 to 1,000 ppm range) to the discharge line from the dilution/mixing manifold.
6. Connect the exhaust tubing from the Draeger PAC III PH3 monitor calibration cap to the inlet port of a Tedlar bag. Open the inlet valve on the Tedlar bag.
7. Begin dilution box calibration by opening the valve to the PH3 calibration gas line only and start sampling using only calibration gas at a flow of approximately 500 SCCM. After the Draeger monitor reading has stabilized, record the base line PH3 concentration.
8. Repeat the previous step using both PH3 calibration gas and nitrogen dilution gas connected to the dilution box. Adjust the flow rates of both the PH3 calibration

gas and nitrogen dilution gas to ratios of approximately 0.5:1, 1:1, 2:1, and 3:1. Record the flow rates. The total gas flow of PH3 calibration gas and nitrogen dilution gas should be approximately 500 SCCM (specified by Draeger for their PH3 monitors). Record the Draeger monitor PH3 concentration for each dilution ratio.

9. After the calibration is completed, close the valve to the PH3 calibration gas line and disconnect the line. Allow the nitrogen dilution gas to run until the sampling equipment has been purged into the Tedlar bag.

10. After the sampling equipment is purged, then close the valve to the nitrogen dilution gas and disconnect the line. Close the Tedlar bag inlet. (The contents of the Tedlar bag must be discharged back into the GETS system.)

11. Calculate the source gas concentration using data collected from Step 9.

    Calculated source gas concentration = (Draeger reading) x [(N2 flow + PH3 flow) / PH3 flow].

12. Compare the calculated source gas concentration with the baseline concentration and compute % error.

    Error = [(Calculated source gas ppm – Baseline ppm) / Baseline ppm] x 100

13. If the average % error is less than 5%, then the dilution box calibration is complete and the perimeter piping sample train is considered to be within acceptable tolerance limits.

**Example of Perimeter Piping Sampling Train Calibration:**

A calibration of the sampling train was conducted on 09/22/2009. The results of this calibration are shown in the following table.

| Perimeter Pipe Monitoring - Sampling Train Calibration | | | | | | |
|---|---|---|---|---|---|---|
| **Date:** | **9/22/09** | **Nitrogen** | **PH3** | | **Calculated** | **Error** |
| **By:** | | **Flow meter** | **Flow meter** | **Draeger** | **Source** | |
| | **Actual Dilution Ratio Calculated from Flow** | **ml/min** | **ml/min** | **ppm** | **Ppm** | **%** |
| | Baseline | 0 | 500 | 530 | 530 | |
| | 0.38 : 1 | 137 | 364 | 384 | 529 | -0.28 |
| | 0.99 : 1 | 248 | 251 | 270 | 537 | 1.28 |
| | 2.51 : 1 | 336 | 134 | 156 | 547 | 3.24 |
| | 3.02 : 1 | 369 | 122 | 134 | 540 | 1.75 |

Notes:

1) Dilution ratio is calculated using the actual flow rates.
2) Calculated source gas concentration = (Draeger reading) **x** [(N2 flow + PH3 flow) / PH3 flow].
3) Error = [(Calculated source gas ppm – Baseline ppm)/Baseline ppm] * 100

### 2.4.4 Perimeter Gas Collection Piping PH3 Sampling Procedures

Perimeter piping sampling is to be performed in two steps. The first step is a screening level sampling to establish the screening level PH3 concentration and is based upon a calculation using operating parameters from the GES. The second level is to perform a more accurate PH3 concentration measurement using a direct gas sampling method, if the screening level is less than 10,000 ppm PH3.

#### 2.4.4.1 Screening-Level Perimeter Piping Gas PH3 Sampling Procedure

This procedure is intended for initial screening of PH3 concentration in a RCRA Pond perimeter piping system when PH3 concentrations are unknown or known to be 10,000 ppm or greater.

1. As this procedure is used when perimeter piping gas PH3 concentration is unknown, it should be assumed that the PH3 levels are very high, i.e., the concentration is well above the concentration that is immediately dangerous to life or health (IDLH = 50 ppm) and well above the lower explosive limit (LEL = 20,000 ppm). Sampling personnel should wear a low-range (0 to 20 ppm PH3) monitor and complete all work in compliance with the *RCRA Pond Area Work Rules*. Approach the perimeter piping riser with a Draeger Pac III field instrument (0 to 20 ppm range) measuring ambient air PH3 concentrations. Check and record the PH3 concentration at the breathing zone (approximately 4 to 5 feet above the ground surface). Note that all RCRA pond TMPs are within the RCRA Pond Area and *RCRA Pond Area Work Rules* will apply to all persons entering this area. In addition, all personnel alarms will be recorded including the measurement reading and location (by GPS). An investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm.

2. Connect the GES unit to the designated perimeter piping riser.

3. Start up the GES to the perimeter piping for at least three perimeter piping volumes turn-over using standard GES operating procedures. Note that the time necessary to extract one perimeter piping volume will be dependent on the PH3 concentration in the perimeter piping and total perimeter piping volume. The purge time will be determined for each pond during the initial purging operation. The GES should remain connected to the perimeter piping and operating during the sampling to provide the motive force for the extraction from the perimeter piping and treatment of extracted perimeter piping gas.

4. After purging the perimeter piping using the GES, the following operating parameters are measured or calculated and recorded from the operating GES:

- Gas flowrate from the perimeter piping standpipe
- GES total flowrate
- GES inlet PH3 concentration using the Draeger Pac III field instrument (0 to 1,000 ppm range)

5. From these recorded GES operating parameters, the perimeter piping gas PH3 concentration can be calculated as follows:

   Screening level perimeter piping gas PH3 conc. = (GES inlet PH3 concentration x total GES flow)/perimeter pipe standpipe flow

6. Repeat steps 3 and 4 to collect two additional screening-level perimeter piping gas PH3 concentrations. These measurements should be collected at least 10 minutes apart. Once the three screening level perimeter piping gas PH3 concentrations are calculated and recorded, average these three results and record.

7. If the average screening level perimeter piping gas PH3 concentration is greater than or equal to 10,000 ppm, it is considered too unsafe to attempt a direct sampling of perimeter piping gas (second-level sampling). The average screening level will be recorded as the perimeter piping PH3 gas concentration.

8. If the average screening level perimeter piping gas PH3 concentration is less 10,000 ppm, proceed to the second-level PH3 sampling procedure.

#### 2.4.4.2 Second-Level Perimeter Piping Gas PH3 Sampling Procedure

This procedure is intended for use in measuring PH3 in pond perimeter piping gas that is known to be less than 10,000 ppm, based on the screening-level perimeter piping gas sampling. To avoid release of PH3 to the environment, the pond gas sampled during this procedure will be discharged directly to the Gas Extraction (GES) unit to avoid discharge of untreated pond gas to the atmosphere.

1. As this procedure is used when perimeter piping gas PH3 concentration is known, but still very high, i.e., the concentration is well above the concentration that is immediately dangerous to life or health (IDLH = 50 ppm), sampling personnel should wear a low-range (0 to 20 ppm PH3) monitor and complete all work in compliance with the *RCRA Pond Area Work Rules*. Approach the perimeter piping riser with a Draeger Pac III field instrument (0 to 20 ppm range) measuring ambient air PH3 concentrations. Check and record the PH3 concentration at the breathing zone (approximately 4 to 5 feet above the ground surface). Note that all RCRA pond TMPs are within the RCRA Pond Area and *RCRA Pond Area Work Rules* will apply to all persons entering this area. In addition, all personnel alarms will be recorded including the measurement reading and location (by GPS). An

investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm.

2. It is assumed that the GES unit is already connected to the perimeter piping riser and was appropriately purged during the screening-level perimeter piping sampling. The GES should remain extracting during the sampling to provide the motive force for the extraction and treatment of extracted perimeter piping gas.

3. Position the perimeter piping gas sampling train and connect to the extraction gas using the couplings as provided at the sampling valve for sampling. The sampling train consists of the following:

   - GeoTech peristaltic sampling pump
   - Gas dilution manifold
   - High-range (0 to 1,000 ppm) Draeger PAC III PH3 monitor equipped with a Draeger calibration cap
   - Nitrogen gas cylinder for sample dilution
   - Discharge tubing connected to the dilution air inlet to the GES unit

4. The gas dilution manifold should always be used in the perimeter piping gas sampling train. However:

   a) If the PH3 measurement from the perimeter piping is expected to be below 1,000 ppm (the limit of the high-range Draeger PAC III PH3 monitor), then the pond gas can be sampled directly through the dilution/mixing manifold without any dilution.

   b) If the PH3 concentration is expected to be above 1,000 ppm, then the pond gas will be diluted with nitrogen using the dilution manifold as appropriate to ensure the diluted sample PH3 concentration is below 1,000 ppm.

5. Mass flow meters in the dilution/mixing manifold indicate the flow rate of pond gas and dilution gas (nitrogen). The combined total flow extracted from the perimeter piping plus any dilution gas should be approximately 500 ml/min. This is the flow for which the Draeger PAC III calibration cap is designed.

6. Connect the suction side of the GeoTech sampling pump to the appropriate sampling port. Connect the discharge side of the GeoTech sampling pump to the designated dilution/mixing manifold mass flow meter (this is the pond gas containing PH3 to be measured).

7. Connect the nitrogen dilution gas, if required, to the designated flow meter on the manifold.

8. Connect the Draeger PAC III 0 to 1,000 ppm PH3 monitor properly to the discharge line from the dilution/mixing manifold.

9. Position the exhaust tubing from the Draeger PAC III PH3 monitor calibration cap to the inlet port of the dilution inlet of the GES. This will ensure the expelled gas is treated through the GES prior to discharge.

10. Begin sampling pond gas by opening the sampling valve to the perimeter piping sample train and start the sampling pump.

11. Adjust the flow rates of pond gas and the nitrogen gas (if needed) through the dilution/mixing manifold flow meters as required to meet the appropriate dilution ratio. The total gas flow of pond gas and nitrogen dilution gas should be approximately 500 ml/min (as specified by Draeger for their PH3 monitors).

12. Monitor the digital display of the Draeger PAC III PH3 monitor. When the PH3 readings have stabilized, record the Draeger monitor PH3 readings, the dilution/mixing manifold gas flow rates, the calculated dilution rate, and the calculated PH3 concentration corrected for any dilution.

13. Record 3 consecutive data sets, at least 10 minutes apart. Record the data on the perimeter piping sampling log sheet. Calculate the average from the 3 data points.

14. After the sampling is completed from the perimeter piping, close the sample port valve and disconnect the sample hose. Allow the sample pump to run on fresh air until the sampling equipment has been purged into the dilution inlet port feeding the GES.

15. After the sampling equipment is purged, then turn off the sampling pump.

## 2.5 POND PERIMETER AND CAP SURFACE AIR MONITORING PROCEDURES

The pond perimeter and cap surface air monitoring program is summarized on Table 3.3 of the *Plan* and the pond perimeter and cap surface monitoring locations at each RCRA pond are shown on Figures 3-11 to 3-18 in the Plan. The pond perimeter and cap surface air monitoring schedule, action levels and field procedures are described in subsections below.

### 2.5.1 Perimeter and Cap Surface Monitoring Schedule and Action Levels

If perimeter gas collection piping PH3 concentrations are 10,000 ppm or greater, then perimeter surface monitoring and, if triggered during perimeter scan, cap surface monitoring will be performed monthly.

If PH3 is detected at any location during the pond cap perimeter surface at or above the action level of 0.05 ppm, the following actions would be taken:

- Attempt to determine the source of the PH3 at the surface;
- Follow the perimeter surface scan with a surface scan over the entire RCRA pond cap surface;
- If a source(s) of the PH3 is identified, perform maintenance within 10 days; and
- Perform a follow-up round of perimeter surface monitoring and, if triggered during perimeter scan, cap surface monitoring within 10 days.

In addition to the above action levels, individuals performing RCRA perimeter and cap surface monitoring will be equipped with an industrial hygiene PH3 monitor, set to alarm at 0.3 ppm and 1.0 ppm as indicated in the RCRA Pond Area Work Rules. Any industrial hygiene alarm of 0.3 ppm PH3 in air (indicating PH3 concentrations in air of 0.3 to 0.99 ppm) that occur will trigger an investigation of the source, extent, and potential corrective action provided that these measures can be safely performed. Any air monitoring reading of 1.0 ppm PH3 or greater in air will also trigger an immediate (initiate within 15 minutes of such reading) round of fenceline monitoring at facility boundary monitoring sites 1 through 9, as described in Section 3.2.4 of the Plan and this *Gas Monitoring FSP*.

### 2.5.2 Perimeter and Cap Surface Scan Monitoring General Procedures

All surface scanning will only be performed during certain meteorological conditions. The surface scanning will not be performed if any of the following meteorological conditions are encountered:

- Rain, snow or other precipitation, based upon local observation;
- Average wind speeds greater than 10 miles per hour, based upon a hand-held anemometer reading;
- Instantaneous wind speed greater than 15 miles per hour, based upon a hand-held anemometer reading;
- Snow cover or surface water accumulation (ponding), based upon local observation.

These meteorological conditions will be recorded prior to start of the perimeter surface scan.

The perimeter and, if triggered, cap surface scanning will be conducted with an integrated sampler, which is a portable self-contained unit that consists of a stainless steel sampling probe, rotometer, battery-powered sampling pump, and a warmed-up, properly calibrated Draeger Pac III field instrument[3] (0 to 20 ppm range version). The integrated sampler is depicted on Figure 2-1. Draeger Pac III field instrument standard operating procedures (SOPs), instructions, and calibration procedures are included in Appendix A-5B. The Draeger Pac III monitor will be calibrated every 14 days per these procedures. While sampling, the probe will be held approximately 1 to 2 inches above the ground surface to the extent practicable given surface vegetation and irregularities. While walking each transect at a normal walking pace (1 to 2 miles per hour), the collection probe inlet will be steadily moved in a horizontal sweeping motion, from side-to-side to extend the width of the collection path to approximately 5 to 6 feet. The sampler flow rate will be set at approximately 500 cubic centimeters per minute as recommended by the manufacturer of the Draeger Pac III field instrument.

The Draeger Pac III field instrument low-level alarm used for the perimeter surface scan will be set to alarm at 0.05 ppm and the high-level alarm will be set to alarm at 1.0 ppm. The Draeger Pac III field instrument output will be recorded at least once per minute during the surface scan and at any point that the low- or high-level alarm is triggered. If either Draeger Pac III alarm (0.05 ppm or 1.0 ppm) is triggered during the perimeter surface scan, the entire pond cap surface for that RCRA pond will also undergo a surface scan as described in Section 2.5.4.

While walking each perimeter area, the Draeger Pac III field instrument will be used to identify "hot spots" where $PH_3$ gas may be releasing through the surface. If either Draeger Pac III alarm sounds, the reading will be logged and the location will be marked with a flag so that further investigation can be conducted in that area, if warranted, to identify potential leak sources or locations. Once the pond perimeter sampling area scan is completed, each flagged hot-spot will be investigated further in an attempt to locate the exact source area of the PH3.

### 2.5.3 Pond Perimeter Surface Scan Sampling Procedure

The walking path for the pond perimeter surface scan will be completed in one pass conducted approximately 3 feet outside the cap anchor trench.

Each of the pond perimeter surface scanning areas will be sampled as a single sampling "cell." The approximate lineal distance for scanning at each RCRA pond is as follows:

[3] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

- Pond 8S = 1,550 feet (see Figure 3-11 of the Plan)
- Pond 8E = 1,725 feet (see Figure 3-12 of the Plan)
- Pond 9E = 3,520 feet (see Figure 3-13 of the Plan)
- Phase IV Ponds = 2,970 feet (see Figure 3-14 of the Plan)
- Pond 15S = 3,080 feet (see Figure 3-15 of the Plan)
- Pond 16S = 2,850 feet (see Figure 3-16 of the Plan)
- Pond 17 = 2,300 feet (see Figure 3-17 of the Plan)
- Pond 18A = 2,250 feet (see Figure 3-18 of the Plan)

The RCRA pond perimeter surface scan sampling procedure is similar for all the ponds as described here.

1. Note that all RCRA ponds are within the RCRA Pond Area and *RCRA Pond Area Work Rules* will apply to all persons entering this area. Also note, while PH3 is not expected in ambient air at these locations, sampling personnel will follow the procedures in the *HASP* and the procedures as outlined in the *RCRA Pond Area Work Rules* if PH3 is detected at the breathing zone.

2. Ensure that the gas sampling pump has been calibrated that sampling day and the Draeger Pac III has been calibrated within the past 14 days. Also ensure that the Draeger Pac III field instrument low-level alarm has been set to 0.05 ppm and the high-level alarm has been set to 1.0 ppm.

3. Pre-determine the pond perimeter walking path at approximately 3 feet outside the anchor trench.

4. Check to ensure that required meteorological conditions are met. Wind speed will be measured prior to the start of the surface scan using a hand-held anemometer. Record wind speed and ambient conditions. If meteorological conditions are not met, reschedule the surface scan. For ponds scheduled for monthly monitoring, surface scanning will be rescheduled within one week. However, if meteorological conditions cannot be met after rescheduling four times, the surface scan will be deferred until the following month. For example, in winter months, snow cover may exist for several weeks during which the meteorological conditions could not be met.

5. Prior to beginning the pond perimeter surface scan, check and record the PH3 concentration at the breathing zone (approximately 4 to 5 feet above the ground surface). In addition, all industrial hygiene PH3 monitor alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading and location (by GPS). For any industrial hygiene alarm, an investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm and potential corrective action once those measures can be safely performed.

6. Hook up the PH3 surface scan sampling train. The PH3 sampling train consists of the stainless steel sampling probe, rotometer, the gas sampling pump, and the Draeger Pac III field instrument equipped with the sampling "cap."

7. At the start of the first pass walking pattern, turn on the sampling pump (set at 500 ml/minute flowrate) and Draeger Pac III.

8. Begin the perimeter surface scan by walking at a normal walking pace (1 to 2 miles per hour) at a distance of approximately 3 feet outside the cap anchor trench, move the sampling probe inlet steadily in a horizontal sweeping motion, from side-to-side to extend the width of the collection path to approximately 5 to 6 feet. Maintain the probe inlet approximately 1 to 2 inches above the ground surface. The output of the Draeger Pac III field instrument will be recorded at least once each minute and any time the alarm sounds. Complete the entire walking pattern for the sample area. At any point during the surface scanning, if the Draeger Pac III alarms, note the level of PH3. If the level is less than 1.0 ppm PH3, mark the spot with a flag and continue the surface scan to completion for that area. If the level is 1.0 ppm or greater PH3, immediately measure the PH3 level in the breathing area (4 to 5 feet above ground). If PH3 in the breathing area is 1.0 ppm or greater, move upwind until out of the PH3 (0.5 ppm or less) and follow the procedures as outlined in the *RCRA Pond Area Work Rules*. Follow the investigation procedure as outlined in Step 5 above.

9. If there were any areas flagged as result of a Draeger Pac III alarm, return to that spot and attempt to locate the source of the PH3 using the Draeger Pac III. Record the information found concerning the "hot spot," including the maximum level of PH3 measured.

### 2.5.4 Pond Cap Surface Monitoring Procedures

RCRA pond cap surface scan monitoring will be performed only if the pond perimeter surface scan results in a detection of 0.05 ppm (or higher) PH3 at the surface. For all surface scan sampling, the PH3 measurement will be made using the Draeger Pac III field instrument (0 to 20 ppm measurement range).

This pond cap surface scan will use the same procedure as the pond perimeter surface scan, except that the pond cap surface will be divided into approximately equal sampling "cells" of about one acre each. Therefore, if triggered, the number of sampling cells for each RCRA pond will be the following:

- Pond 8S = 3.2 acres = 3 sampling cells (see Figure 3-11 of the Plan)
- Pond 8E = 4.1 acres = 4 sampling cells (see Figure 3-12 of the Plan)
- Pond 9E = 12.9 acres = 13 sampling cells (see Figure 3-13 of the Plan)
- Phase IV Ponds = 8.9 acres = 9 sampling cells (see Figure 3-14 of the Plan)
- Pond 15S = 9.4 acres = 9 sampling cells (see Figure 3-15 of the Plan)
- Pond 16S = 10.1 acres = 10 sampling cells (see Figure 3-16 of the Plan)

- Pond 17 = 9 acres = 9 sampling cells (see Figure 3-17 of the Plan)
- Pond 18 A = 3.8 acres = 4 sampling cells (see Figure 3-18 of the Plan)

The walking path for the pond cap surface scan will be completed in two passes within each sampling cell. The second pass will follow a parallel path to the first but be offset by 10 feet to provide greater coverage.

### 2.5.5 Pond Cap Surface Scan Sampling Procedure

The RCRA pond cap surface scan sampling procedure is similar for all the ponds as described here.

1. Note that all RCRA ponds are within the RCRA Pond Area and *RCRA Pond Area Work Rules* will apply to all persons entering this area. Also note, while PH3 is not expected in ambient air at these locations, sampling personnel will follow the procedures in the *HASP* and the procedures as outlined in the *RCRA Pond Area Work Rules* if PH3 is detected at the breathing zone.

2. Ensure that the gas sampling pump has been calibrated that sampling day and the Draeger Pac III has been calibrated within the past 14 days. Also ensure that the Draeger Pac III field instrument low-level alarm has been set to 0.05 ppm and the high-level alarm has been set to 1.0 ppm.

3. Pre-determine the pond cap sampling cell walking paths.

4. Check to ensure that required meteorological conditions are met. Wind speed will be measured prior to the start of the surface scan using a hand-held anemometer. Record wind speed and ambient conditions. If meteorological conditions are not met, reschedule the surface scan. For ponds scheduled for monthly monitoring, surface scanning will be rescheduled within one week. However, if meteorological conditions cannot be met after rescheduling four times, the surface scan will be deferred until the following month. For example, in winter months, snow cover may exist for several weeks during which the meteorological conditions could not be met.

5. Prior to beginning the pond cap surface scan, check and record the PH3 concentration at the breathing zone (approximately 4 to 5 feet above the ground surface). In addition, all industrial hygiene PH3 monitor alarms (set at 0.3 ppm and 1.0 ppm) will be recorded including the measurement reading and location (by GPS). For any industrial hygiene alarm, an investigation will be performed and documented to determine, if possible, the source of the PH3 causing the alarm and potential corrective action once those measures can be safely performed.

6. Hook up the PH3 surface scan sampling train. The PH3 sampling train consists of the stainless steel sampling probe, rotometer, the gas sampling pump, and the Draeger Pac III field instrument equipped with the sampling "cap."

7. At the start of the first pass walking pattern, turn on the sampling pump (set at 500 ml/minute flowrate) and Draeger Pac III.

8. Begin the first pass by walking at a normal walking pace (1 to 2 miles per hour), move the sampling probe inlet steadily in a horizontal sweeping motion, from side-to-side to extend the width of the collection path to approximately 3 to 5 feet. Maintain the probe inlet approximately 1 to 2 inches above the ground surface. The output of the Draeger Pac III field instrument will be recorded at least once each minute and any time the alarm sounds. Complete the entire walking pattern for the sample area. At any point during the surface scanning, if the Draeger Pac III alarms, note the level of PH3. If less than 1.0 ppm PH3, mark the spot with a flag and continue the surface scan to completion for that area. If the level is 1.0 ppm or greater PH3, immediately measure the PH3 level in the breathing area (4 to 5 feet above ground). If PH3 in the breathing area is 1.0 or greater, move upwind until out of the PH3 (0.5 ppm or less) and follow the procedures as outlined in the *RCRA Pond Area Work Rules*. Follow the investigation procedure as outlined in Step 5 above.

9. After completing the first pass, begin the second pass (offset 10 feet from the first pass path).

10. If there were any areas flagged as result of a Draeger Pac III alarm, return to that spot and attempt to locate the source of the PH3 using the Draeger Pac III. Record the information found concerning the "hot spot," including the maximum level of PH3 measured. Also conduct monitoring of adjacent low-lying areas per the procedure in Section 2.5.

## 2.6 CONTINGENT FENCELINE MONITORING

Contingent fenceline monitoring will be conducted if triggered by the following:

- As prescribed by the *RCRA Pond Area Work Rules*, individuals (or groups) will be equipped with an industrial hygiene PH3 monitor, set to alarm at 0.3 ppm and 1.0 ppm. An alarm reading of 1.0 ppm PH3 or greater in air will trigger an immediate (initiate within 15 minutes of such reading) round of fenceline monitoring at facility boundary monitoring sites 1 through 9.

- Any ambient air reading equal to or exceeding 1.0 ppm PH3 that is registered during RCRA pond appurtenance air monitoring (i.e., approximately 12-inches outside TMP enclosures, LCDRS manholes, cap drainage lift stations or control panels, regardless of height above ground surface) will trigger an immediate (initiate within 15 minutes of such reading) round of fenceline monitoring at sites 1 through 9.

The fenceline monitoring stations 1 through 9 are shown on Figure 2-3. Readings at each location will be taken at breathing level (4 to 5 feet above ground level) and at ground

level (approximately 4 to 6 inches above ground level). The monitoring will be performed using a Draeger Pac III field instrument[4] (0 to 20 ppm PH3 sensor).

Sites 1 through 4 are located near the Union Pacific railroad line and spur tracks into the FMC and Simplot properties. At these locations there is a potential that diesel emissions from locomotive engines idling on the adjacent tracks may interfere with the Draeger Pac III sensors and provide false positive detections of PH3. In addition, Sites 1 is located in close proximity to the operating Simplot Don Plant and there is a potential that emissions from the Simplot sulfuric acid plant and/or ammonia plant may interfere with the Draeger Pac III sensors and provide false positive detections of PH3. If monitoring personnel observes a non-zero phosphine reading at these locations and also observes a nearby idling railroad engine, smells engine exhaust, or smells distinct sulfur or ammonia odors, the monitoring personnel will record the reading and also note the presence and location of the suspected source of interference relative to the monitoring site. If a potential false positive is above the fenceline threshold screening level of 0.25 ppm phosphine, the monitoring personnel will move to each of the adjacent monitoring stations and take a reading. If the adjacent monitoring station readings are zero at both breathing and ground levels, the monitoring personnel will return to the site of the initial detection and take another reading. If the second reading is still above the fenceline threshold screening level of 0.25 ppm phosphine, then the monitoring personnel will immediately proceed with the offsite monitoring and actions as described in Section 2.6.1 below. If either of the adjacent monitoring station readings are non-zero at either breathing or ground levels, then the monitoring personnel will immediately proceed with the offsite monitoring and actions as described in Section 2.2 below.

The monitoring personnel shall complete a log sheet by entering the PH3 meter reading for each round of monitoring at each site (location and height). The monitoring personnel shall sign and date the form and submit it to the FMC Project Coordinator on the next business day.

### 2.6.1 Threshold Levels and Response Actions at the Fenceline and Off Site

This section describes the threshold levels for initiating offsite monitoring and response actions in the event that action levels are exceeded. Table 2-1 provides an overview of these procedures and associated PH3 threshold response levels.

These PH3 threshold response levels are based on federal guidelines referred to as Acute Exposure Guideline Levels (AEGLs). The guideline values for PH3 were initially published by EPA on October 30, 1997 (62 FR 58840) and were set in the *Pond*

[4] Draeger has discontinued manufacturing the Pac III monitors but according to a Draeger representative they will continue to provide sensors and basic repairs for the PAC III. The PAC III is being replaced by the Draeger PAC 7000 for the low range PH3 sensor (0 – 20 ppm) and the by the X-AM 5000 for the high-range PH3 sensor (0-1,000 ppm). FMC may utilize the Pac III, Pac 7000, X-AM 5000 or equivalent monitors for the gas monitoring program.

*Management Plan* at what was the initial 1-hour exposure period. EPA has revised the AEGLs and the Highway 30 response action level of 0.25 ppm PH3 is based the current AEGL for a potential 8-hour exposure period. These levels may be amended with the approval of EPA.[5] The fenceline threshold screening level has been conservatively set at the current AEGL for a potential 8-hour exposure period of 0.25 ppm PH3. The fenceline threshold screening level does not consider the results of FMC's prior EPA SCREEN3 dispersion model that was used to predict concentrations that would take into consideration the dispersion (i.e., dilution) that occurs as air flows from the fenceline north of former Pond 18 Cell B to Highway 30 (a minimum distance of approximately 86 meters). The previous EPA SCREEN3 dispersion model calculated fenceline threshold level of 0.33 ppm PH3 that would result in an offsite concentration of 0.25 ppm PH3 was calculated for low wind speeds and stable atmospheric conditions; these conditions would tend to minimize the amount of dilution of PH3 between the ponds and the highway. Thus, setting the fenceline threshold screening level at 0.25 ppm PH3 is highly conservative and provides added assurance that the threshold level is protective.

The PMP as originally developed in 1998 and amended in 2004 established certain threshold levels and response actions when the drag strip property was leased from FMC and in use. After FMC terminated the lease, the lessee vacated the property and it remains unoccupied. The former Tesco property, which is adjacent to the former drag strip, was acquired by FMC in 1999. The former Tesco property has been unoccupied for many years and remains unoccupied.

### 2.6.2 Highway 30 Offsite Monitoring and Response Procedures

FMC shall monitor PH3 levels at five points along Highway 30 whenever a PH3 concentration along the FMC fenceline exceeds the threshold-screening level of 0.25 ppm. The first offsite measurement shall be made within 15 minutes unless access is delayed by factors outside of FMC's control, in which case the measurement will be taken as soon as possible. The first measurement shall be taken at Site A, as shown in Figure 2-3. A direct-reading personal PH3 monitor shall be used in taking these measurements. The next measurements shall be taken at Sites B, C, D and then E. The monitoring personnel will notify (by telephone) the FMC Project Coordinator and maintain contact with the FMC Project Coordinator while collecting the measurements described in this section.

If any reading along Highway 30 is above 0.25 ppm PH3, the monitoring personnel will continue to monitor all 5 sites in rotation and will check for any signs of occupancy along Highway 30 and on the Union Pacific railroad tracks. If any PH3 measurement at any of the 5 monitoring locations along Highway 30 exceeds 0.25 ppm FMC shall (a) notify and

[5] Revised AEGLs for phosphine were published June 23, 2000 (Federal Register 65 (122): 3926). The revised phosphine AEGLs are higher than the 1998 proposed levels and would support an upward adjustment in threshold levels of approximately 20%. The most current AEGLs are found in the National Research Council Publication *Acute Exposure Guideline Levels for SelectedAirborne Chemicals: Volume 6* (2007), which specify 0.25 ppm phosphine for an 8-hour AEGL2, as used in this plan.

offer to escort any pedestrians, joggers, persons stopped or working along the adjacent area, train switchers, and stranded or stopped motorists from the area along the highway; (b) advise the local police[6] that the properties should be evacuated; and (c) make notifications specified in section 2.6.4 and 2.6.5, below.

### 2.6.3 Data Assessment along Highway 30

If any reading at Sites A, B, C, D or E is above 0.25 ppm PH3, the monitoring personnel will continue monitoring at the five sites in rotation. If a PH3 measurement at any monitoring location exceeds 0.25 ppm, the monitoring personnel (or FMC Project Coordinator) will notify and offer to escort any individuals away from the area of potential exposure – this could include anybody stopped on Highway 30 and on the Union Pacific railroad tracks. If a train is idling on the Union Pacific Railroad line in the vicinity of the above threshold readings, the monitoring personnel (or FMC Project Coordinator) shall call the Union Pacific Response Management Communications Center (RMCC) at 1-888-877-7267 and advise that the train should be moved out of the area. FMC shall implement other actions as specified in the current RCRA Interim Status Contingency Plan, as appropriate.

Notice of any public evacuation shall be made by phone to the Shoshone-Bannock Tribes, the Power County Sheriff, and EPA Region 10 (CERCLA On Scene Coordinator) as soon as possible but no longer than 1 hour after the evacuation has been completed. This notification will be confirmed by email no later than the end of the next business day.

### 2.6.4 Communication and Continued Surveillance

Whenever PH3 levels are being monitored along Highway 30, the monitoring personnel shall communicate the monitoring results to the FMC Project Coordinator. The FMC Project Coordinator is responsible to communicate these data to the FMC Remediation Director. The monitoring personnel and FMC Project Coordinator are responsible for notifying and offering to escort any individuals away from the area of potential exposure, as noted in section 3.1.4.

The monitoring personnel shall continue measurements at the five sites along Highway 30 until two consecutive sets of measurements indicate that PH3 levels are less than 0.25 ppm at Sites A through E. Offsite monitoring and surveillance shall then be discontinued, unless otherwise directed by the FMC Remediation Director.

[6] The Power County Sheriff's Office has advised FMC that it should not be notified of elevated phosphine levels along Highway 30 unless their assistance is needed.

### 2.6.5 Notification of Offsite (Highway 30) Phosphine Action Level Exceedances

Notification of a confirmed exceedance of PH3 threshold levels at Highway 30, as specified on the Notification List below (independent of whether Highway 30 was occupied at the time of measurement), shall be made to EPA Region 10 (CERCLA On Scene Coordinator), the Power County Sheriff, and the Shoshone-Bannock Tribes by telephone as soon as possible and no longer than one hour after public evacuation is complete. This notification will be confirmed by email no later than the end of the next business day. The same data shall be forwarded to these parties by email.

**Notification List**

| **Regulatory Agency/Tribal Official** | **Confirmed PH3 Exceedances along Hwy 30** |
|---|---|
| CERCLA On Scene Coordinator U.S. EPA, Region 10<br>(208) 378-5773 | ✓ |
| Shoshone-Bannock Tribes Emergency Management & Response<br>(208) 237-0137 (during business hours) and via the Fort Hall Police Dispatcher ((208) 478-4000) during non-business hours | ✓ |
| Power County Sheriff<br>550 Gifford<br>American Falls, ID<br>(208) 226-2319 | ✓ |

## 2.7 SOIL GAS MONITORING DURING CAP MAINTENANCE WORK AT RCRA PONDS

As future maintenance of the RCRA Pond final cover systems may include intrusion (excavation) within the limit of the final cover and/or within 20 feet of the anchor trench. FMC will prepare a work plan specific to the scope of any future intrusive maintenance work within the limit of final cover that will identify worker safety procedures that may be needed in addition to those specified in the Site-Wide Health and Safety Plan and incorporated *RCRA Pond Area Work Rules*. Temporary soil gas monitoring probe(s) may be installed to support the project-specific job planning and safety analysis prior to performing work should intrusive maintenance work be required within the limit of final cover. This *RCRA Pond Post-Closure Plan* cannot reasonably address all of the potential future maintenance scenarios and cannot replace the need for project-specific planning and safety analysis.

A procedure for the installation and monitoring of temporary soil gas probes that is based on the procedures that FMC previously utilized to support prior RCRA Pond maintenance activities is summarized below:

**Pre-construction Checklist**

- Ensure that a Notice to Proceed has been issued for the construction contract;
- Ensure the equipment and supplies (e.g., soil gas probe, sample port ball valve) have been received and accepted;
- Prepare a list of all project team members, including 24-hour telephone numbers for each person;
- Finalize and approve the project schedule (actual field work to install one probe is < 1 day);
- Complete the FMC Excavation permit and obtain all clearances and required approvals;
- Review the health and safety training status of all members of the project team and ensure that a Job Planning Safety Analysis (JPSA) has been prepared by the Contractor;
- Conduct health and safety training of all employees and require them to read and sign the JPSA; and,
- Surveyors, under the direction of the CQA Manager, will mark with a stake and flagging the location(s) of the new soil gas probe(s).

**Procedures**

1. Complete all pre-construction items.
2. Prior to beginning installation of the new soil gas probe(s), a breathing zone measurement and a 'shoe laces' (e.g., a few inches above ground surface) PH3 measurement will be taken at the location of the new soil gas probe. The values will be recorded. Work will not proceed unless the breathing zone measurement allows the work to proceed consistent with the *RCRA Pond Area Work Rules*.
3. Set the section of prefabricated 5/8" OD drive pipe outfitted with screened drive tip internally connected to ¼" OD fluoropolymer tubing.
4. Push drive pipe 24 inches down into the soil and stop.
5. Premix a bucket of hydrated bentonite to a flowable consistency

6. Excavate a shallow pit around the drive pipe approximately 6” deep next to the pipe and approximately 12” radius around the drive pipe. Pour premixed hydrated bentonite into the pit around the drive pipe.

7. Continue driving the pipe downward to the project-specific total depth. Add hydrated bentonite to the pit around the drive pipe as needed to maintain a seal around the pipe. After driving the pipe to the project-specific total depth, pull the drive pipe back 2 inches to expose the screen portion of the tip.

8. Install sample port ball valve to the open end of the ¼” OD fluoropolymer tubing that extends out to the top of the drive pipe.

9. Connect sample pump and assure screened section is revealed and gas flow is established.

10. After confirming gas flow, complete bentonite seal at surface by adding dry bentonite to the pit surrounding the pipe until the pit is level with the surrounding soil. Add water as needed to hydrate the bentonite to a wet (but not flowable) consistency.

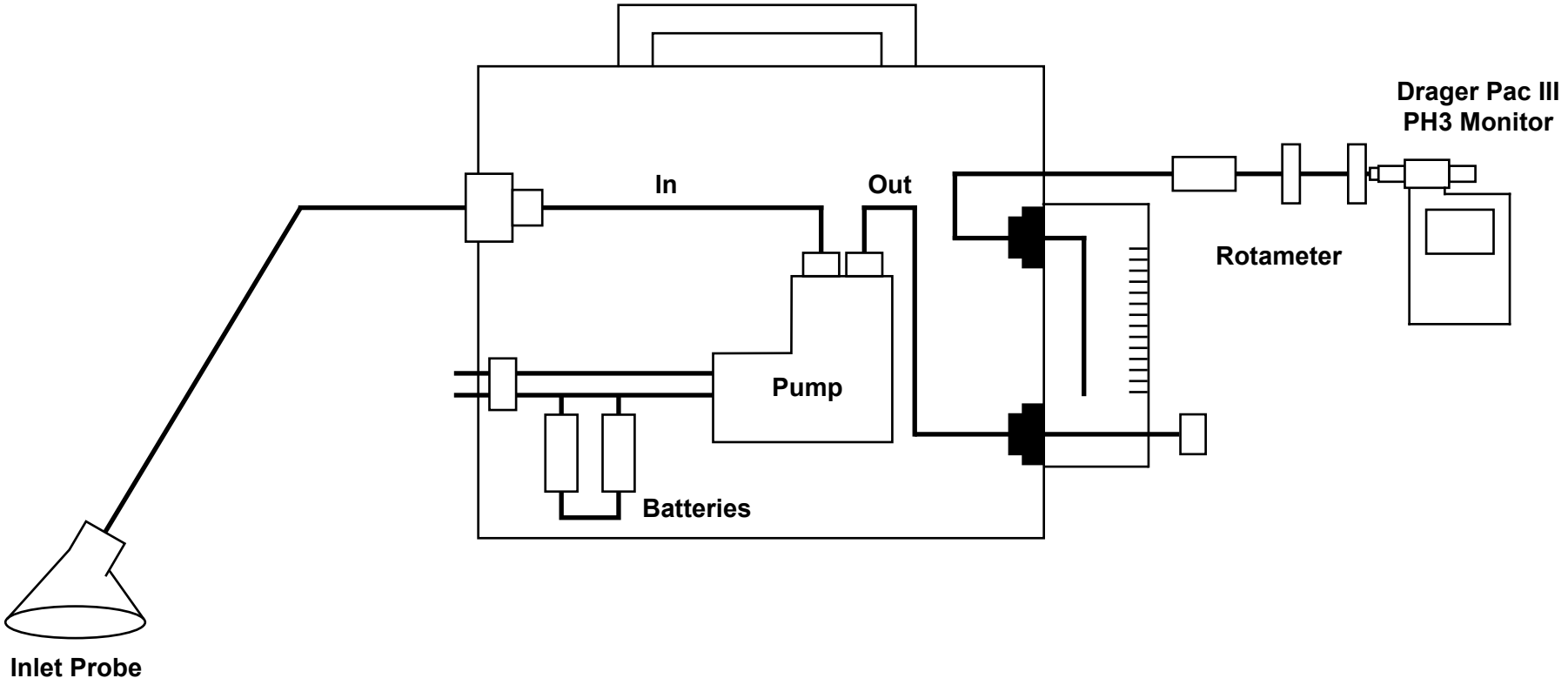
**TABLE 2-1**
**THRESHOLD LEVELS AND RESPONSE PROCEDURES – CONTINGENT FENCELINE MONITORING**

| Location | Magnitude | Response Actions |
|---|---|---|
| At plant fenceline (nine specific locations along the northern facility property fenceline) | $PH_3 < 0.25$ [1] ppm | No further response needed. |
| | $PH_3 \geq 0.25$ [1,2] ppm | Monitoring personnel notifies FMC Project Coordinator of measurement and that he or she is proceeding to monitor along Highway 30.<br>Monitoring personnel proceeds to first Highway 30 monitoring station within 15 minutes. Monitoring is discontinued at fenceline Sites 1 – 9.<br>Monitoring personnel initiates monitoring along Highway 30. |
| Along Highway 30 (five specific sites known as Sites A – E) | $PH_3 < 0.25$ ppm | No further response needed if PH3 < 0.25 ppm. Monitoring personnel will resume routine and/or contingent monitoring program. |
| | $PH_3 \geq 0.25$ [2] ppm | Initial reading - Monitoring personnel will visually check for signs of occupants at the former TESCO and drag strip areas and continue to take readings at all 5 sites in rotation.<br>If the reading at any site is 0.25 ppm or greater, the monitoring personnel will notify the FMC Project Coordinator and will begin to clear the area of pedestrians, joggers, persons stopped or working, stranded or stopped motorists, train switchers, idling trains, and any occupants of the former TESCO and/or drag strip areas if present.<br>FMC will make notifications per Section 2.6.5 of the *Gas Monitoring FSP*.<br>Monitoring personnel will continue monitoring activity until $PH_3$ readings are < 0.25 ppm at all of the five monitoring sites (Sites A – E) along Highway 30. |

1 These concentrations were conservatively set at the AEGL rather than the threshold value previously calculated using the EPA SCREEN3 dispersion model that was predicted to achieve the exposure level described in footnote 2 below.

2 These phosphine concentrations are taken from published federal guidelines referred to as Acute Exposure Guideline Levels (AEGLs). The most current AEGLs are found in the National Research Council Publication *Acute Exposure Guideline Levels for Selected Airborne Chemicals: Volume 6* (2007), which specify 0.25 ppm phosphine for an 8-hour AEGL2, as used in this plan.

FILE *Fig 2-01_Surface Scan Integrated Sampler_Dec2012*



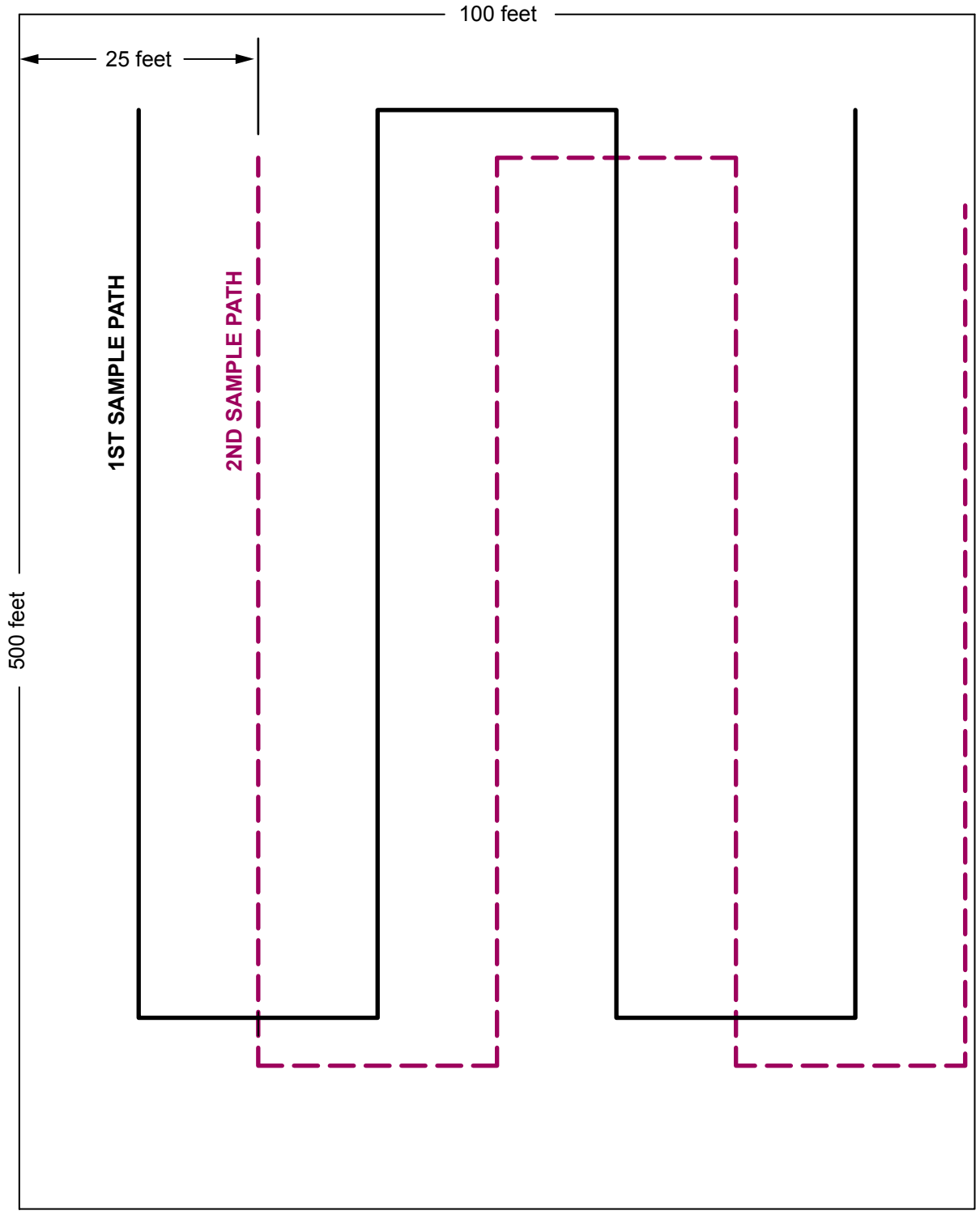

FMC

**RCRA POND POST-CLOSURE PLAN**
**FSP FOR GAS MONITORING**

**FIGURE 2-1**

**SURFACE SCAN**
**INTEGRATED SAMPLER**

MWH




FMC

RCRA POND POST-CLOSURE PLAN
FSP FOR GAS MONITORING

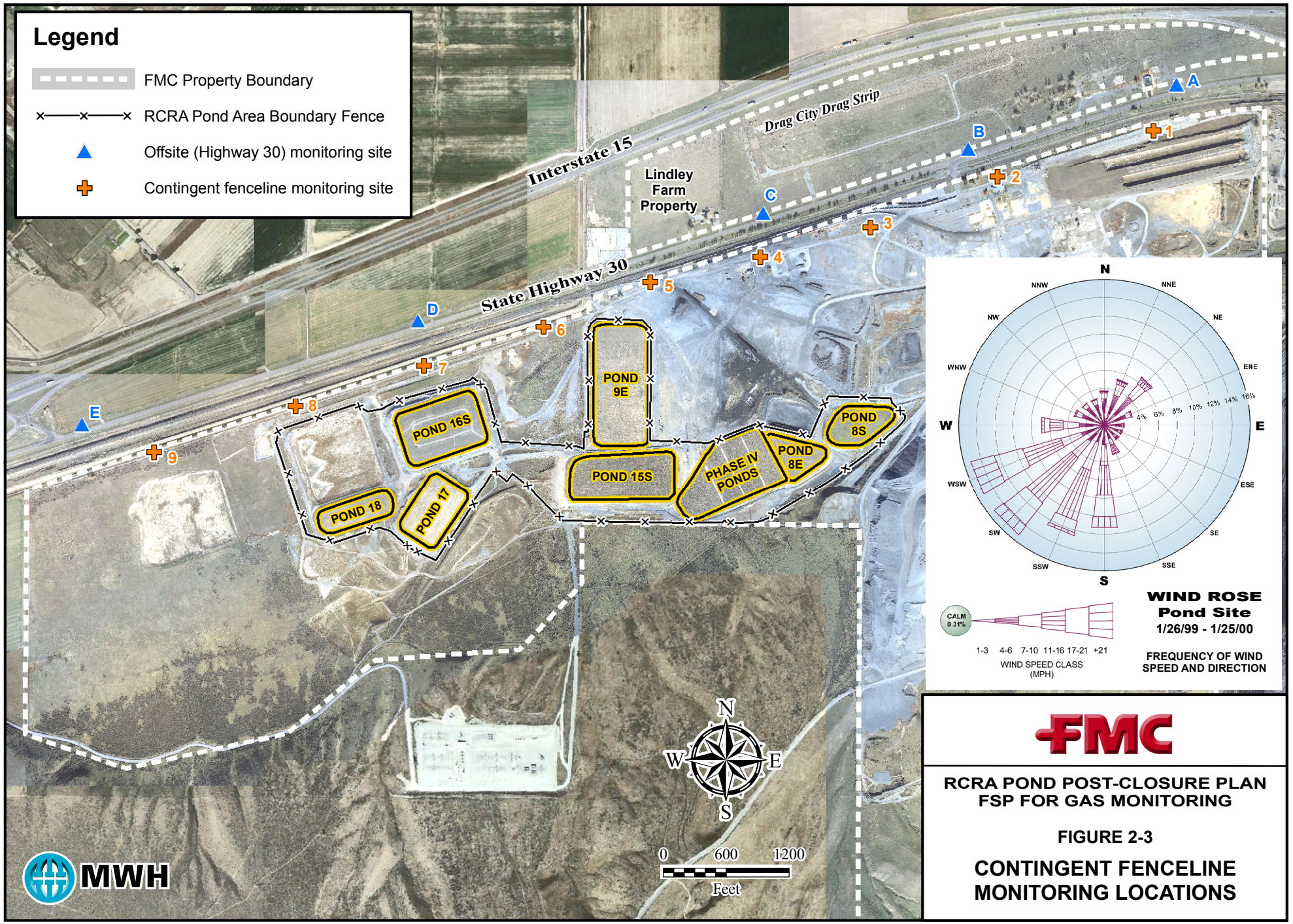
FIGURE 2-2

SURFACE SCAN
WALKING PATTERN

MWH

FILE *Fig 2-02_Surface Scan Walking Pattern_Dec2012*

FILE: I:\FMCidaho\RCRA POND_Post Closure_Dec2012\FIGURES\Fig 2-03_Contingent Fenceline Monitoring_8x11_Dec2012REV1.mxd



# Section 3
# GENERAL GAS MONITORING PROGRAM METHODS AND PROCEDURES

This section describes elements that are common to the RCRA Pond gas monitoring activities. Common elements described in this section include: 1) field documentation procedures, 2) reporting and recordkeeping, 3) equipment decontamination procedures, and 4) waste handling and disposal.

## 3.1 FIELD LOGBOOKS AND FIELD FORMS

All information pertinent to the field activities will be entered directly into a field logbook and/or task-specific field forms. Information entered into the logbook and/or field forms will include:

- Monitor/Inspector's name(s).
- Date and time of inspection and monitoring.
- Monitoring location and description.
- Field observations and details important to interpreting the monitoring results (e.g., heavy rains, wind speed and direction, odors).
- Measurement data (e.g. monitored PH3 result).
- Any exceedance of an action level and corresponding actions.

The date(s) of monitoring (monitoring period) will be indicated in mm/dd/yy format, and the time will be indicated in accordance with the military convention. The monitored parameter will be indicated in an unambiguous shorthand.

## 3.2 REPORTING AND RECORDKEEPING

The gas monitoring program results will be reported annually in the *RCRA Pond Annual Post-Closure Report* as specified in Section 7.2.1 of the Plan. All monitoring records will be maintained consistent with Section 7.3 of the Plan.

## 3.3 EQUIPMENT DECONTAMINATION PROCEDURES

It is not expected that any equipment decontamination will be required for field implementation of the RCRA Pond gas monitoring program because the Dreager Pac III field instruments utilized for the monitoring do not come into contact with any waste material. Because the work will be performed in Level D personal protective equipment,

any spent or worn-out PPE (e.g, gloves) will be disposed as described in Section 5.1 of the Plan.

## 3.4 DISPOSAL OF WASTE

Any wastes generated during the field implementation of the RCRA Pond gas monitoring program will be managed in accordance with Section 5.2 of the Plan.

# APPENDIX A-5A

SOPs and Instructions for Sampling Equipment

# APPENDIX A-5B

Calibration Procedures for Draeger PH3 Meter